

*Faculty, Adjunct professors, Research scientists,
Visiting scientists, Lecturers, PhD students, Post-doc
and Staff
at the Pescara Center
November 2017*

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ICRANet Faculty Staff

Barres de Almeida, Ulisses	CBPF, Rio de Janeiro, Brazil
Belinski, Vladimir	ICRANet
Bianco, Carlo Luciano	ICRANet and Università di Roma "Sapienza"
Bini, Donato	CNR, Italy
Chardonnet, Pascal	ICRANet and Université de la Savoie, France
Cherubini, Christian	ICRANet and Campus Biomedico, Italy
Filippi, Simonetta	ICRANet and Campus Biomedico, Italy
Jantzen, Robert	Abraham Taub-ICRANet Chair and Villanova University, USA
Kerr, Roy P.	Yevgeny Mikhajlovic Lifshitz - ICRANet University of Canterbury, New Zeland
Muccino, Marco	ICRANet and Università di Roma "Sapienza"
Ohanian, Hans	Rensselaer Polytechnic Institute, New York, USA
Pisani, Giovanni Battista	ICRANet and Università di Roma "Sapienza"
Punsly, Brian Mathew	Mathew California University, Los Angeles USA
Rueda, Jorge A.	ICRANet and Università di Roma "Sapienza"
Ruffini, Remo	ICRANet and Università di Roma "Sapienza"
Sahakyan, Narek	ICRANet-Yerevan, Armenia
Vereshchagin, Gregory	ICRANet
Xue, She Sheng	ICRANet

Adjunct Professors of the Faculty

Amati, Lorenzo	Istituto di Astrofisica Spaziale e Fisica Cosmica, Italy
Arnett, David	Subramanyan Chandrasekhar - ICRANet Chair, University of Arizona, Tucson, AZ, USA
Belvedere, Riccardo	Centro Brasileiro de Pesquisas Físicas
Bini, Donato	CNR, Italy
Buchert, Thomas	Centre de Recherche Astrophysique de Lyon, UCBL1, ENS-L, CNRS, France
Camargo Rodrigues de Lima, Rafael	Universidade do Estado de Santa Catarina, Brazil
Chakrabarti, Sandip Kumar	Indian Centre for Space Physics, Kolkata, India
Chardonnet, Pascal	ICRANet and Université de la Savoie, France
Cherubini, Christian	ICRANet and Campus Biomedico, Italy
Damour, Thibault	<i>Joseph-Louis Lagrange - ICRANet Chair</i> , IHES, Bures sur Yvette, France
Della Valle, Massimo	Osservatorio di CapodiMonte, Italy
Einasto, Jaan	Tartu Observatory, Tõravere, Estonia
Everitt, Francis	<i>William Fairbank - ICRANet Chair</i> , Stanford University, USA
Filippi, Simonetta	ICRANet and Campus Biomedico, Italy
Fisher, Robert	University of Massachusetts Dartmouth
Frontera, Filippo	University of Ferrara, Italy
Fryer, Chris L.	University of Arizona, Tucson, Arizona, USA
Giommi, Paolo	ASI, Italian Space Agency
Gionti, Gabriele	Vatican Observatory
Harutyunian, Haik	Byurakan Astrophysical Observatory
Jantzen, Robert	<i>Abraham Taub-ICRANet Chair</i> , Villanova University, USA

Jetzer, Philippe	Institute of Theoretical Physics - University of Zürich, Switzerland
Khalatnikov Isaak M.	Lev Davidovich Landau - <i>ICRANet Chair</i>
Kleinert, Hagen	Richard Feynmann - ICRANet Chair, Freie Universität Berlin
Kerr, Roy	Yevgeny Mikhajlovic Lifshitz - ICRANet Chair and University of Canterbury, New Zeland
Lee, Hyung Won	Inje University, Korea
Mansouri, Reza	Sharif University of Technology
Mathews, Grant	University of Notre Dame
Merafina, Marco	University of Rome La Sapienza, Italy
Mirabel, Felix	CEA
Mo, Houjun	University of Massachusetts
Muccino, Marco	ICRANet and Università di Roma "Sapienza"
Nicolai, Hermann	Albert Einstein Institute – Potsdam, Germany
Pelster Axel	Hanse Institute of Advanced Study, Germany
Pian, Elena	INAF - Osservatorio Astronomico Trieste, Italy
Piran, Tsvi	Yuval Neeman-ICRANet Chair and the Hebrew University, Israel
Pisani, Giovanni Battista	ICRANet and Università di Roma "Sapienza"
Punsly, Brian Mathew	Mathew California University, Los Angeles USA
Quevedo, Hernando	Institute of Nuclear Science, UNAM
Rosati, Piero	European Southern Observatory, Germany
Sahakyan, Narek	ICRANet-Yerevan, Armenia
Sobouti, Yousef	Institute for Advanced Studies in Basic Sciences, IASBS, Iran
Titarchuk, Lev	<i>Victor Sobolev – ICRANet Chair</i> , US Naval Laboratory, USA
Zen Vasconcellos, Cesar Augusto	UFRGS, Porto Alegre, RS, Brazil

Lecturers

Aksenov, Alexei	Institute for Theoretical and Experimental Physics
Alekseev, Georgy	Steklov Mathematical Inst- Russian Acad of Sciences
Bini, Donato	CNR and ICRANet, Italy
Chen, Pisin	National Taiwan University, Kavli Instit. Particle Astrophysics and Cosmology
Cherubini, Christian	Campus Biomedico, Rome, Italy
Chieffi, Alessandro	INAF, Rome, Italy
Coullet, Pierre	Université de Nice - Sophia Antipolis, France
Di Castro, Carlo	Università di Roma "Sapienza", Italy
Jing, Yi-Peng	Shangai Astronomy Observatory
Lanz, Thierry	Observatoire de la Côte d'Azur, Nice, France
Lee, Chul Hoon	Hanyang University, Seoul, Korea
Lee, Hyun Kyu	Department of Physics, Hanyang University, Korea
Limongi, Marco	INAF, Rome, Italy
Lou, You Qing	Tsinghua University, Beijing
Mester, John	Stanford University, USA
Ohanian, Hans	Rensselaer Polytechnic Institute, New York, USA
Pacheco, José	Observatoire de la Côte d'Azur, Nice, France
Perez Bergliaffa, Santiago	Univesidade do Estado de Rio de Janeiro, Brasil
Pucacco Giuseppe	Università di Tor Vergata, Rome, Italy
Sang Pyo Kim	Kunsan National University, Korea
Sepulveda, Alonso	University of Antioquia, Columbia
Song Doo Jong	Korea Astronomy and Space Science Institute, South Korea
Starobinsky, Alexei	Landau Institute for Theoretical Physics, Russia
Sung-Won Kim	Institute of Theoretical Physics for Asia-Pacific, Korea

Wiltshire David

University of Canterbury, New Zealand

Research Scientists

Arguelles, Carlos	ICRANet
Benetti, Micol	ICRANet
Bernardini, Maria Grazia	ICRANet and Università di Roma "Sapienza", Italy
Boshkayev, Kuantay	ICRANet
Geralico, Andrea	ICRANet and Università di Roma "Sapienza", Italy
Lattanzi, Massimiliano	University of Oxford and ICRANet
Muccino, Marco	ICRANet
Patricelli, Barbara	ICRANet and Università di Roma "Sapienza", Italy
Rotondo, Michael	ICRANet and Università di Roma "Sapienza", Italy
Sahakyan, Narek	ICRANet
Sigismondi, Costantino	ICRANet
Siutsou, Ivan	ICRANet-Minsk

Visiting Scientists

Abishev, Medeu	Al-Farabi Kazakh National University, Kazakhstan
Ahmedov, Bobomurat	Uzbekistan Academy of Sciences
Alfonso Pardo, Wilmer Daniel	Universidad de Antioquia Medellín, Antioquia, Colombia
Ansoldi, Stefano	University of Udine
Arkhangelskaya, Irene	Moscow Engineering Physics Institute, Russia
Bakytzhan, Zhami	Al-Farabi Kazakh National University, Kazakhstan
Batebi, Saghar	Isfahan University of Technology, Iran
Bavarsad, Ehsan	Isfahan University of Technology, Pakistan
Bernal, Cristian Giovanni	Universidad Nacional Autónoma de México (UNAM), Mexico
Blinne, Alexander	University Jenna, Germany
Cadez, Andrej	University of Ljubljana, Slovenia
Cho, Yongmin	UNIST
Corvino, Giovanni	University of Rome La Sapienza, Italy
Da Cunha, Bruno Carneiro	UFPE, Brazil
Davis, Stanley	Université Bordeaux, France
De Lorenci, Vitorio	Federal University Of Itajuba - Brazil
Ewald, Denise Grüne	Universidade Federal do Rio Grande do Sul, Brazil
Fimin, Nicolaj	Keldish Institute for Applied Mathematics, Russia
Gadri, Mohamed	University of Tripoli, Libya
Gallego Cadavid, Alexander	Universidad de Antioquia Medellín, Antioquia, Colombia
Goulart, Erico	Centro Brasileiro de Pesquisas Físicas, Brazil
Guzzo, Marcelo Moraes	Universidade Estadual de Campinas, Brazil
Haghighat, Mansour	Isfahan University of Technology, Iran

Hoang, Ngoc-Long	IPE, Hanoi, Vietnam
Hütsi, Gert	Tartu Observatory, Estonia
Kenesbek, Zhadyra	Al-Farabi Kazakh National University, Kazakhstan
Kim, Hongsu	KASI
Kim, Hyeong-Chan	Chungju National University
Kim, Hyuong Yee	INJE, South Korea
Kim, Jim Young	Kunsan National University
Lee, Chang-Hwan	Pusan National University
Lee, Hyung Won	Inje University
Lee, Wonwoo	Cquest, Sogang University
Malheiro, Manuel	ITA, Brazil
Mansouri, Reza	Sharif University of Technology, Iran
Mohammadi, Rohollah	Isfahan University of Tecnology, Iran
Moliné, Maria de los Angeles	Instituto de Astrofísica e Ciências do Espaço, Lisboa
Mosquera Cuesta, Herman	Instituto Federal de Educação, Ciência e Tecnologia do Ceará, Brazil
Motie, Iman	Isfahan University of Tecnology, Pakistan
Nagataki, Shigehiro	Yukawa Institute for Theoretical Physics, Kyoto University
Nessipbay, Aizhan	Al-Farabi Kazakh National University, Kazakhstan
Pakhshan, Espoukeh	Azad University
Park, Ilhung	Ieu, Ewha Womans University
Park, Myeong-Gu	Kyungpook National University
Passiltay, Ainur	Al-Farabi Kazakh National University, Kazakhstan
Paudel, Rishiram	Tribhuvan University, Central Department of Physics
Peres Menezes, Débora	Universidade Federal de Santa Catarina, Brazil
Peresano, Michele	University of Udine, Italy

Perez Bergliaffa, Santiago	Universidade do Estado do Rio de Janeiro, Brazil
Perez Martínez, Aurora	Instituto de Cibernética Matemática Y Física, Cuba
Piechocki, Włodzimierz	Institute for Nuclear Studies - Poland
Picanço Negreiros, Rodrigo	Universidade Federal Fluminense, Brazil
Qadir, Ashgar	National University of Sciences and Technology - Pakistan
Raffaelli, Bernard	Université de Corse, France
Riahi, Rashid	Isfahan University of Technology, Iran
Romano, Antonio Enea	Universidad de Antioquia Medellín, Antioquia, Colombia
Romero, Gustavo E.	Instituto Argentino de Radioastronomía IAR-CONICET, Argentina
Sasaki, Misao	Kyoto University, Japan
Shakeri, Soroush	Isfahan University of Technology, Iran
S. O. Kepler	Universidade Federal do Rio Grande do Sul, Brazil
Tarasenko, Aleksander	Belarusian State University
Teixeira Coelho, Hélio	Universidade Federal de Pernambuco, Brazil
Tkachenko, Alessya	Al-Farabi Kazakh National University, Kazakhstan
Torres, Sergio	Centro Internacional de Física, Bogotá, Colombia
Torrieri, Donato Giorgio	Universidade Estadual de Campinas, Brazil
Tizchang, Seddigheh	Isfahan University of Technology, Iran
Van Putten, Maurice	Korean Institute for Advanced Study, South Korea
Yang, Jongmann	Ieu, Ewha Womans University
Yeom, Dong-Han	Cquest, Sogang University
Zalaletdinov, Roustam	Dept. of Theoretical Physics, Institute of Nuclear Physics, Uzbek Academy of Sciences, Uzbekistan
Zhumabayeva, Symbat	Al-Farabi Kazakh National University, Kazakhstan

International Relativistic Astrophysics Ph. D

First Cycle 2002-2005
Peirani, Sebastien France

Second Cycle 2003-2006
Bernardini, Maria Grazia Italy
Mattei, Alvise Italy
Mercuri, Simone Italy

Third Cycle 2004-2007
Chiappinelli, Anna France
Cianfrani, Francesco Italy
Guida, Roberto Italy
Rotondo, Michael Italy
Yegorian, Gegham Armenia
Vereshchagin, Gregory Belarus

Fourth Cycle 2005-2008
Battisti, Marco Valerio Italy
Dainotti, Maria Giovanna Italy
Khachatryan, Harutyun Armenia
Lecian, Orchidea Maria Italy
Pizzi, Marco Italy
Pompi, Francesca Italy

Fifth Cycle 2006-2009
Caito, Letizia Italy
De Barros, Gustavo Brazil
Minazzoli, Olivier Switzerland
Patricelli, Barbara Italy
Rangel Lemos, Luis Juracy Brazil
Rueda Hernandez, Jorge Armando Colombia

Sixth Cycle 2007-2010
Ferroni, Valerio Italy
Izzo, Luca Italy
Kanaan, Chadia Italy
Pugliese, Daniela Italy
Sigismondi, Costantino Italy
Siutsou, Ivan Belarus

Seventh Cycle 2008-2011
Belvedere, Riccardo Italy
Ceccobello, Chiara Italy
Ferrara, Walter Italy
Han, Wen-Biao China
Luongo, Orlando Italy
Pandolfi, Stefania Italy
Taj, Safia Pakistan

<i>Eighth Cycle</i>	<i>2009-2012</i>
Boshkayev, Kuantay	Kazakhstan
Bravetti, Alessandro	Italy
Haney, Maria	Germany
Lombardi, Caterina Antonietta	Italy
Menegoni, Eloisa	Italy
Sahakyan, Narek	Armenia
Sahini, Sahil	India

<i>Ninth Cycle</i>	<i>2010-2013</i>
Arguelles, Carlos	Argentina
Benetti, Micol	Italy
Muccino, Marco	Italy

<i>Tenth Cycle</i>	<i>2011-2014</i>
Cáceres Uribe, Diego Leonardo	Colombia
Wang, Yu	China

<i>Eleventh Cycle</i>	<i>2012-2015</i>
Barbarino, Cristina	Italy
Cipolletta, Federico	Italy
Dichiara, Simone	Italy

<i>Twelfth Cycle</i>	<i>2013-2016</i>
Becerra, Laura	Colombia
Harutyunyan, Vahagn	Armenia

<i>Thirteenth Cycle</i>	<i>2014-2017</i>
Moradi, Rahim	Iran
Rodriguez Ruiz, Jose Fernando	Colombia

<i>Fourteenth Cycle</i>	<i>2015-2018</i>
Melon Fuksman, J. David	Argentina
Primorac, Daria	Croatia
Uribe S., Juan D.	Colombia

<i>Fifteenth Cycle</i>	<i>2016-2019</i>
Baghmanyanyan, Vardan	Armenia
Bedić, Suzana	Croatia
Campion, Stefano	Italy
Chen, Yen-Chen	Taiwan
Gasparyan, Sargis	Armenia
Marongiu, Marco	Italy
Martone, Renato	Italy
Vieira Lobato, Ronaldo	Brazil
Zargaryan, Davit	Armenia

IRAP Ph. D. Erasmus Mundus Students

<i>First Cycle</i>	<i>2010-2013</i>
Baranov, Andrey	Russia
Benedetti, Alberto	Italy
Dutta, Parikshit	India
Fleig, Philipp	Germany
Gruber, Christine	Austria
Liccardo, Vincenzo	Italy
Machado De Oliveira Fraga, Bernardo	Brazil
Martins De Carvalho, Sheyes	Brazil
Penacchioni, Ana Virginia	Argentina
Valsan, Vineeth	India
<i>Second Cycle</i>	<i>2011-2014</i>
Begue, Damien	France
Dereli, Husne	Turkey
Gregoris, Daniele	Italy
Iyyani, Shabnam Syamsunder	India
Pereira, Jonas Pedro	Brazil
Pisani, Giovanni	Italy
Rakshit, Suwendu	India
Sversut Arsoli, Bruno	Brazil
Wu, Yuanbin	China
<i>Third Cycle</i>	<i>2012-2015</i>
Bardho, Onelda	Albania
Enderli, Maxime	France
Filina, Anastasia	Russia
Galstyan, Irina	Armenia
Gomes De Oliveira, Fernanda	Brazil
Khorrami, Zeinab	Iran
Ludwig, Hendrik	Germany
Sawant, Disha	India
Strobel, Eckhard	Germany
<i>Fourth Cycle</i>	<i>2013-2016</i>
Ahlén, Olof	Sweden
Gómez Diaz, Gabriel	Colombia
Kovacevic, Milos	Serbia
Li, Liang	China
Lisakov, Sergey	Russia
Maiolino, Tais	Brazil
Sridhar, Srivatsan	India
Stahl, Clément	France
Yang, Xiaofeng	China
<i>Fifth Cycle</i>	<i>2014-2017</i>
Aimuratov, Yerlan	Kazakhstan
Chang, Yu-Ling	Taiwan

Delgado, Camilo
Efremov, Pavel
Karilca, Mile
Krut, Andreas
Martinez Aviles, Gerardo

Colombia
Russia
Croatia
Germany
Mexico

CAPES Students

First Cycle

Brandt Carlos Henrique

Guimarães Carvalho Gabriel

Pereira Lobo Iarley

2013-2016

Brazil

Brazil

Brazil

Administrative and Secretarial Staff

ICRANet - Pescara

Adamo, Cristina

Brandolini, Gabriele

Ciampaglione, Maria

Di Berardino, Federica

Di Ianni, Marco

Di Niccolo, Cinzia

Latorre, Silvia

Verzulli, Damiano

Administrative Office

System Manager

Secretariat

Head of the Secretarial Office

System Manager

Secretariat

Administrative Office

System Manager

ICRANet Ar – Armenia

Kostandjan Susanna

ICRANet Faculty Staff

Barres de Almeida, Ulisses



Position: Adjunct Professor
Period covered: 2016

I Scientific Work

My main scientific activities focus on gamma-ray astrophysics and astroparticle physics. In particular, on planning and development of a new gamma-ray detector for the LATTES project, and, as a member of the Cherenkov Telescope Array Consortium (CTA), I am responsible for the optical system of the prototype Large Size Telescope (LST-1). In the MAGIC Collaboration, I serve as member of the publication committee. I am also responsible for the project of the Brazilian Science Data Center (BSDC).

II Conferences and educational activities

II a Conferences and Other External Scientific Work

As organizer:

1. Gravitation, Astrophysics and Cosmology (GrACo III) - LOC
2. IWARA 2016 - 7th International Workshop on Relativistic Astrophysics. - Scientific Committee
3. GROUP 31 - 31st International Colloquium on Group Theoretical Methods in Physics. - LOC

As invited / participant:

1. Astroparticle Physics @ Yachay. Design and expected performance of a novel hybrid detector for very-high-energy gamma astrophysics. (Equador) - invited
2. BRICS Astronomy Workshop 2016 Astronomical Data and Computation. Implementation of a Brazilian Science Data Center (Russia) - invited.
3. CTA Archive Interface Meeting. (Italy)
4. CTA Consortium Meeting (FALL). (Italy).
5. CTA Large Size Telescope General Meeting. Final Report on the Interface Plates Project for the LSTs. (Germany).
6. Gravitation, Astrophysics and Cosmology - GrACo III. Update on the status of the Cherenkov Telescope Array (Brazil).

7. The Lake Baikal Three Messenger Conference. Design and expected performance of a novel hybrid detector for very-high-energy gamma astrophysics. (Russia).
8. Towards a large field-of-view TeV experiment in the South. Large Array Telescope for Transient and Energetic Sources (LATTES). (Brazil).

II b Work With Students

1. M.SC. advisor - Davide Romagnoli. Characterization of an RPC-type Muon detector for the MARTA high-energy cosmic ray experiment. - Università degli Studi di Milano, Centro Brasileiro de Pesquisas Físicas. (concluded)
2. Ph.D. advisor - Bruno Fontes Souto. Studies of the array layout for the Cherenkov Telescope Array. - Centro Brasileiro de Pesquisas Físicas, CAPES. (2013-17)
3. Ph.D. advisor - Saulo Ramalho. Estudo em polarimetria óptica de jatos relativísticos de blazares. Tese (Doutorado em Física-CBPF) - Centro Brasileiro de Pesquisas Físicas, CAPES. (2016-)

II c Diploma thesis supervision

1. Priscilla Behar Jorge. Estudo do Fenômeno de QPO em Blazares VHE. - Centro Brasileiro de Pesquisas Físicas, CAPES. (2016-17)

II d Other Teaching Duties

1. Mini-course at IFCE / Ceará - “High-Energy Gamma-ray Astrophysics”

II e. Work With Postdocs

1. Post-doc supervision - Bernardo Fraga. Centro Brasileiro de Pesquisas Físicas, FAPERJ (2016-)

III. Service activities

III a. Within ICRANet

1. Coordination of the Brazilian Science Data Center (BSDC).

III b. Outside ICRANet

1. Post-graduate course at CBPF - “Introduction to Astroparticle Physics”

IV. Other

2016 List of Publication

Barres de Almeida, U.. TeV Astrophysics: Probing the Relativistic Universe. World Scientific Research, 2017.
(in press)

ASSIS, P. ; **Barres de Almeida, U.** ; et al. Design and expected performance of a novel hybrid detector for very-high-energy gamma astrophysics. Astroparticle Physics, 2016. (submitted)

Barres de Almeida, U.; JERMAK, H. ; STEELE, I. ; et al. The RINGO2 and DIPOL Optical Polarisation Catalogue of Blazars. MNRAS 2016. (in press)

For a complete list, please see my Google Scholar profile:

https://scholar.google.com.br/citations?hl=en&user=asoaK5UAAAAJ&view_op=list_works&sortby=pubdate

Belinski Vladimir



Position: ICRANet, Faculty Member

Period covered: December 2016 -December 2017

I. Scientific Work

1. Large part of scientific work during 2017 have been dedicated to finishing the text and to complete all technical work for the book "The Cosmological Singularity" by V.Belinski and M.Henneaux (Cambridge University Press). The book have been published 26 October 2017 (hard copy) and now is available at ICRANet (see Ref.1).

Abstract of the book. Written for researchers focusing on general relativity, supergravity, and cosmology, this is a self-contained exposition of the structure of the cosmological singularity in generic solutions of the Einstein equations, and an up-to-date mathematical derivation of the theory underlying the Belinski–Khalatnikov–Lifshitz (BKL) conjecture on this field. Part I provides a comprehensive review of the theory underlying the BKL conjecture. The generic asymptotic behavior near the cosmological singularity of the gravitational field, and fields describing other kinds of matter, is explained in detail. Part II focuses on the billiard reformulation of the BKL behavior. Taking a general approach, this section does not assume any simplifying symmetry conditions and applies to theories involving a range of matter fields and space-time dimensions, including supergravities. Overall, this book will equip theoretical and mathematical physicists with the theoretical fundamentals of the Big Bang, Big Crunch, Black Hole singularities, the billiard description, and emergent mathematical structures.

2. In 2014 ICRANet started the new program “Exact solutions in the super-symmetric General Relativity” in collaboration with the group of Prof. Hermann Nicolai at Albert Einstein Institute at Potsdam (Germany). In 2017 in the framework of this program the new work has been done dedicated to the exactly integrable models in supergravity. It was continued the general way of extension of the pure gravity inverse scattering integration technique to the case when fermions (introduced on the base of supersymmetry) are present. In this year the integrability technique for simple ($N=1$) supergravity in two space-time dimensions coupled to the matter fields taking values in the Lie algebra of $E_{8(+8)}$ group was developed. This theory contains matter living only in one Weyl representation of $SO(16)$ and represents the reduction to two dimensions of the three-dimensional simple supergravity constructed earlier by H. Nishino and S. Rajpoot (2002). The proposed spectral linear problem use superspace and covers the complete set of principal bosonic and fermionic equations of motion. This linear system, as in pure gravity, contains only the first order poles with respect to the spectral parameter. The procedure of constructing the exact super-solitonic solutions is outlined (see Ref. 2).

3. It was proposed a new alternative (with respect to the accelerated universe paradigm) explanation of the discrepancy between values of the distances to the far galaxies following from the observations and

from the standard Friedmann model. Observations show that these distances are a little bit larger in comparison with what is predicted by the usual Friedmann cosmology. However, this standard theory does not take into account traces the strong gravitational waves of cosmological origin leave in space. We show that such traces can be a cause for the aforementioned discrepancy. The sources of cosmological waves are inhomogeneities of a solitonic type of the gravitational field near the Big Bang. Due to expansion of the universe these inhomogeneities decay but each of them expels solitonic gravitational waves which also decay in course of propagation through the expanding space transferring, however, their energies to the Friedmann background making the distances different compared with those which would be observed without such waves. This effect has been described earlier (V. Belinski, 1979) by example of single-soliton cylindrical wave propagating on the Friedmann background. Now the same phenomenon has been confirmed for double-soliton waves both for cylindrical and planar symmetries (see Ref. 3).

II. Publications

- [1] V. Belinski and M. Henneaux "The Cosmological Singularity", Cambridge University Press, October 2017.
- [2] V. Belinski "On the integrable gravity coupled to fermions", Phys. Lett. **B 769**, 100 (2017).
- [3] V. Belinski and G. Vereshchagin "On the cosmological gravitational waves and cosmological distances", arXiv:1710.11588 [gr-qc]; submitted for publication.

Bianco Carlo Luciano

Position: ICRANet Faculty staff
Member of ICRANet Scientific Committee
Member of IRAP-PhD Faculty

Period covered: 2005 – 2017



I Scientific Work

Research on: Gamma-Ray Bursts, Relativistic astrophysics, Cosmology.

II Conferences and educational activities

II a Conferences and Other External Scientific Work

Gave the following invited lectures:

- C.L. Bianco, M.G. Bernardini, P. Chardonnet, F. Fraschetti, R. Ruffini, S.-S. Xue; Our model for Gamma-Ray Bursts; *1st Bego scientific rencontre*, Université de Nice Sophia-Antipolis, Nice, France, 14 February 2006.
- C.L. Bianco; Equations of motion and beaming in Gamma – Ray Bursts; *1st Cesare Lattes Meeting*, Mangaratiba (RJ), Brazil, 1 March 2007.
- C.L. Bianco, M.G. Bernardini, L. Caito, M.G. Dainotti, R. Guida, R. Ruffini; Theoretical interpretation of GRB060614; *2007 April Meeting of the American Physical Society*; Jacksonville, Florida (USA), 14 April 2007.
- C.L. Bianco; The fireshell model and the canonical GRB scenario; *Scuola Nazionale di Astrofisica (National School of Astrophysics)* (II course, IX cycle); Venice (Italy), 18 September 2007.
- C.L. Bianco, M.G. Bernardini, L. Caito, M.G. Dainotti, R. Guida, R. Ruffini, G. Vereshchagin, S.-S. Xue; Equations of motion of the fireshell; *3rd Stueckelberg Workshop*; Pescara (Italy), 10 July 2008.
- C.L. Bianco, M.G. Bernardini, L. Caito, G. De Barros, L. Izzo, F.A. Massucci, B. Patricelli, R. Ruffini, G. Vereshchagin, S.-S. Xue; The fireshell equations of motion and equitemporal surfaces; *6th Italian-Sino Workshop*; Pescara (Italy), 29 June 2009.
- C.L. Bianco, M.G. Bernardini, L. Caito, G. De Barros, L. Izzo, B. Patricelli, R. Ruffini; The canonical GRB scenario within the fireshell model: “long”, “genuine short” and “disguised short” GRBs; *GRB 2010: Dall’eV al TeV tutti i colori dei GRB – Secondo congresso italiano sui GRB*; Cefalù (Italy), 15 June 2010.

- A.G. Aksenov, M.G. Bernardini, C.L. Bianco, L. Caito, C. Cherubini, G. De Barros, A. Geralico, L. Izzo, F.A. Massucci, B. Patricelli, M. Rotondo, J.A. Rueda Hernandez, R. Ruffini, G. Vereshchagin, S.-S. Xue; New developments of the Fireshell scenario; *The Shocking Universe Meeting*, San Servolo, Venice (Italy), September 2009.
- C.L. Bianco, M.G. Bernardini, L. Caito, G. De Barros, L. Izzo, B. Patricelli, R. Ruffini; The fireshell equations of motion and the P-GRB observational properties; *2nd Galileo – Xu GuangQi meeting*, Ventimiglia (Italy), July 2010.
- C.L. Bianco, M.G. Bernardini, L. Caito, G. De Barros, L. Izzo, B. Patricelli, R. Ruffini; The fireshell model for GRBs: toward a canonical GRB scenario; *3rd Galileo – Xu GuangQi meeting*, Beijing (China), October 2011.

II b Work With Students

- Students of the IRAP-PhD program at University “La Sapienza”, Rome, Italy: Yerlan Aimuratov, Maria Grazia Bernardini, Letizia Caito, Maria Giovanna Dainotti, Gustavo De Barros, Maxime Enderli, Roberto Guida, Luca Izzo, Mile Karlika, Milos Kovacevic, J. David Melon Fuksman, Marco Muccino, Barbara Patricelli, Ana Virginia Penacchioni, Giovanni Battista Pisani, Daria Primorac, Luis Juracy Rangel Lemos, Yu Wang.
- Students of the First three years degree Thesis (“Tesi di Laurea triennale”) in Physics at University “La Sapienza”, Rome, Italy: Giulia De Rosi, Eliana La Francesca, Francesco Alessandro Massucci, Federica Volpi.
- Students of the Final Degree Thesis (“Tesi di Laurea Vecchio Ordinamento”) in Physics at University “La Sapienza”, Rome, Italy: Letizia Caito, Walter Ferrara, Laura Rosano.

II c Diploma thesis supervision

- 2005. External supervisor of the First three years degree thesis (“Tesi di laurea triennale”) in Physics by Francesco Alessandro Massucci at University “La Sapienza”, Rome, Italy.
- 2006. External supervisor of the Degree thesis in Physics by Letizia Caito at University “La Sapienza”, Rome, Italy.
- 2007. Thesis advisor of the IRAP-PhD Degree Thesis by Maria Grazia Bernardini at University “La Sapienza”, Rome, Italy.
- 2008. External supervisor of the First three years degree thesis (“Tesi di laurea triennale”) in Physics by Eliana La Francesca at University “La Sapienza”, Rome, Italy.
- 2008. Thesis advisor of the IRAP-PhD Degree Thesis by Roberto Guida at University “La Sapienza”, Rome, Italy.
- 2009. External supervisor of the Degree thesis in Physics by Laura Rosano at University “La Sapienza”, Rome, Italy.

- 2010. Thesis advisor of the IRAP-PhD Degree Thesis by Letizia Caito at University “La Sapienza”, Rome, Italy.
- 2010. External supervisor of the First three years degree thesis (“Tesi di laurea triennale”) in Physics by Giulia De Rosi at University “La Sapienza”, Rome, Italy.

II d Other Teaching Duties

- Assistant teacher in the course of “Laboratory of Electromagnetism and Circuits” by Prof. Giulio D’Agostini at Physics Department of the University “La Sapienza”, Rome, Italy, academical year 2005/2006.
- Assistant teacher in the course of “Laboratory of Systems and Signals” by Prof. Mario Mattioli at Physics Department of the University “La Sapienza”, Rome, Italy, academical years 2007/2008, 2008/2009, 2009/2010, 2010/2011, 2011/2012, 2012/2013.
- Assistant teacher in the course of “Laboratory of Systems and Signals” by Prof. Andrea Nigro at Physics Department of the University “La Sapienza”, Rome, Italy, academical years 2013/2014, 2014/2015, 2015/2016, 2016/2017.
- Assistant teacher in the course of “Laboratory of Systems and Signals” by Prof. Mauro Raggi at Physics Department of the University “La Sapienza”, Rome, Italy, academical years 2013/2014, 2014/2015, 2015/2016, 2016/2017, 2017/2018.

III. Service activities

III a. Within ICRANet

- Administrator of the two servers used for numerical computations at ICRANet – Rome.
- Secretariat of the IRAP PhD.
- Member of the ICRANet Scientific Committee.
- Member of the IRAP PhD Faculty

III b. Outside ICRANet

- “Cultore della Materia” (“Expert of the subject”) for the “FIS/01 – Experimental Physics”, “FIS/02 – Theoretical Physics, Models and Mathematical Methods”, “FIS/05 – Astronomy and Astrophysics” scientific sectors in the Mathematical, Physical and Natural Sciences Faculty of the University of Rome “La Sapienza”.

IV. Other

2017 List of Publication

Y. Aimuratov, R. Ruffini, M. Muccino, C.L. Bianco, A.V. Penacchioni, G.B. Pisani, D. Primorac, J.A. Rueda, Y. Wang; *GRB 081024B and GRB 140402A: Two Additional Short GRBs from Binary Neutron Star Mergers*; The Astrophysical Journal, 844, 83 (2017).

J.A. Rueda, Y. Aimuratov, U. Barres de Almeida, L.M. Becerra, C.L. Bianco, C. Cherubini, S. Filippi, M. Karlica, M. Kovacevic, J.D. Melon Fuksman, R. Moradi, M. Muccino, A.V. Penacchioni, G.B. Pisani, D. Primorac, R. Ruffini, N. Sahakyan, S. Shakeri, Y. Wang; *The binary systems associated with short and long gamma-ray bursts and their detectability*; International Journal of Modern Physics D, 26, 1730016 (2017).

R. Ruffini, Y. Aimuratov, L.M. Becerra, C.L. Bianco, M. Karlica, M. Kovacevic, J.D. Melon Fuksman, R. Moradi, M. Muccino, A.V. Penacchioni, G.B. Pisani, D. Primorac, J.A. Rueda, S. Shakeri, G.V. Vereshchagin, Y. Wang, S.-S. Xue; *The cosmic matrix in the 50th anniversary of relativistic astrophysics*; International Journal of Modern Physics D, 26, 1730019 (2017).

R. Ruffini, Y. Wang, Y. Aimuratov, U. Barres de Almeida, L.M. Becerra, C.L. Bianco, Y.C. Chen, M. Karlica, M. Kovacevic, L. Li, J.D. Melon Fuksman, R. Moradi, M. Muccino, A.V. Penacchioni, G.B. Pisani, D. Primorac, J.A. Rueda, S. Shakeri, G.V. Vereshchagin, S.-S. Xue; *Early X-Ray Flares in GRBs*; The Astrophysical Journal, 852, 53 (2018).

Bini Donato



Position: Reasercher (permanent position) at
Istituto per le Applicazioni del Calcolo,
"M. Picone," CNR
Via dei Taurini, 19 I-00185 Roma
Period covered: 1995 -today.

I Scientific Work

The main topic of my interest is General Relativity with special attention to several classical aspects, like the analysis and the interpretation of exact solutions of Einstein's field equations.

In particular, I'm interested in spacetime splitting techniques, measurement process and the role of the observer in General Relativity, particle dynamics in certain fixed gravitational backgrounds (either test particles with scalar structure: the mass, or particles with internal structure: spinning test particles and particles with multipolar structure, quadrupolar and beyond), gravitational perturbations, gravitational waves. Currently, the main topics of interest for my research activities involve the PN approximation of General Relativity, gravitational self-force, effective-one-body model, with applications to binary systems.

I'm an expert user of MAPLETM tensor calculus package.

II Conferences and educational activities

Conferences and Other External Scientific Work

Since 1988 I have participated in all the international meetings of the Marcel Grossmann series as well as all the conferences of the ICRA- ICRANet series.

Diploma thesis supervision

I've been supervisor of the Diploma thesis of several students at the University of Rome "La Sapienza", since 1995:

G. Spoliti, A. Merloni, C. Germani, C. Cherubini, G. Miniutti, G. Cruciani, A. Geralico, A. Lunari, M. De Mattia, D. Gregoris.

Ph.D thesis supervision

Dr. V. Montaquila, Physics departments of the University of Naples "Federico II.," year 2011.

Dr. M. Haney, IRAP Ph.D, University of Rome "Sapienza," year 2013.

Gabriel G. Carvalho (CAPES, Brazil and ICRANet)

Teaching experiences

I'm Contract Professor of Physics since 2004 at the faculty of Medicine of the University Campus Biomedico, in Rome. From 2007-2009 I have also been Contract Professor of Physics at the Nursery School of the same university.

Work With Postdocs

A Geralico (University of Rome "La Sapienza" and ICRANet)

III Service activities

Scientific collaboration with:

Prof. R. Ruffini (University of Rome, Italy and ICRANet);

Prof. R.T. Jantzen (Villanova University, USA and ICRANet);

Outside ICRANet

Scientific collaboration with:

Prof. T. Damour (IHES, Paris, France).

Prof. F. de Felice (University of Padova, Italy);

Dr. A. Ortolan (INFN Legnaro, Padova, Italy);

Other

I'm currently doing referee activity for a large number of international journals in the field of General Relativity and I'm a reviewer for Mathreview.

For the years 2002-2004 I have been the leader of a collaboration project between the Italian Research Council (CNR) and the analogous institution in Venezuela. Title of the project: *Construction of 3d numerical models for the study of magnetohydrodynamics in gravitational physics and astrophysics*.

For the years 2007-2008 I have been the leader of young researchers projects of INDAM (Istituto Nazionale di Alta Matematica). Title of the project: *Light coordinates and spacetime topography*.

For the years 2008-2009 I have been the leader of young researchers projects of INDAM (Istituto Nazionale di Alta Matematica). Title of the project: *Sistemi di Posizionamento Globale relativistici*

2017 List of publications

- 1) Bini D., Geralico A., Jantzen R.T.,
Gyroscope precession along general timelike geodesics in a Kerr black hole spacetime
Phys. Rev. D 95, 124022 (2017)
DOI: 10.1103/PhysRevD.95.124022
e-print arXiv:1703.09525 [gr-qc].
- 2) Bini D., Geralico A., Ortolan A.,
Deviation and precession effects in the field of a weak gravitational wave
Phys. Rev. D 95, 104044 (2017)
DOI: 10.1103/PhysRevD.95.104044
- 3) Bini D., Chicone C., Mashhoon B.,
Relativistic Tidal Acceleration of Astrophysical Jets
Phys. Rev. D 95, 104029 (2017)
DOI: 10.1103/PhysRevD.95.104029
- 4) Bini D., Geralico A.

Hyperbolic-like elastic scattering of spinning particles by a Schwarzschild black hole
Gen. Rel. Gravit. 49, 84 (2017)
DOI:10.1007/s10714-017-2247-2

- 5) Kavanagh C., Bini D., Damour T., Hopper S., Ottewill A.C., Wardell B.,
Spin-orbit precession along eccentric orbits for extreme mass ratio black hole binaries and its effective-one-body transcription
Phys. Rev. D 96, 064012 (2017)
DOI:10.1103/PhysRevD.96.064012
e-print arXiv:1706.00459 [gr-qc].
- 6) Bini D., Damour T.,
Gravitational scattering of two black holes at the fourth post-Newtonian approximation
Phys. Rev. D, 96, 064021 (2017)
DOI:10.1103/PhysRevD.96.064021
e-print arXiv:1706.06877v1 [gr-qc]
- 7) Bini D., Geralico A., Jantzen R.T.,
Position determination and strong field parallax effects for photon emitters in the Schwarzschild spacetime
Gen. Rel. Grav. 49, no. 12, 151 (2017)
[arXiv:1707.00955 [gr-qc]].
- 8) Bini D., Geralico A., Vines J.,
Hyperbolic scattering of spinning particles by a Kerr black hole
Phys. Rev. D 96, no. 8, 084044 (2017)
doi:10.1103/PhysRevD.96.084044
[arXiv:1707.09814 [gr-qc]].
- 9) Bini D., Chicone C., Mashhoon B.,
Anisotropic gravitational collapse and cosmic Jets
Phys. Rev. D 96, no. 8, 084034 (2017)
doi:10.1103/PhysRevD.96.084034
[arXiv:1708.01040 [gr-qc]].
- 10) Bini D., Damour T.,
Gravitational spin-orbit coupling in binary systems, post-Minkowskian approximation and effective one-body theory
Phys. Rev. D, 96, 104038 (2017)
doi:10.1103/PhysRevD.96.104038
e-print arXiv: 1709.00590 [gr-qc]

CHARDONNET Pascal

Position: Professeur des Universités
Adjunct Professor of the ICRANet Faculty
Period covered: 2015



I Scientific Work

The formation of the first stars hundreds of millions years after the Big-Bang marks the end of what it is called the « Dark Ages ». Currently, we have no direct observations on how the primordial stars formed. This new window is paramount of importance in astrophysics and cosmology. Certainly, the new generation of telescopes will test these theoretical ideas about the formation of the primordial stars. Today's telescopes cannot look far enough into the cosmic past to observe the formation of the first stars. If we want to see that process, we need sophisticated numerical simulations. Pop III stars also have a potential to produce gamma-ray bursts (GRBs). GRBs may provide one of the most promising methods of directly probing the final stages of Pop III stars.

In this proposal we intend to develop a numerical code to study the explosion of such massive stars and to develop observational consequences (astrophysical and cosmological) of these results to the Pop III stars. Hydrodynamical simulations will be performed with our own numerical code based on the Piecewise Parabolic Method on a Local stencil. Extension of PPML-code to full 3D case to study the 3D hydrodynamic effects on the explosion of a star with realistic physics. This includes implementation of full equation of state of the stellar matter, self-gravity computations, radiation transfer implementation.

II Conferences and educational activities

II a Conferences and Other External Scientific Work

II b Work With Students

II c Diploma thesis supervision

Andrey Baranov (2010-2013):

On Pair Instability Supernovae Explosion and Gamma-Ray Bursts

Now Andrey is researcher at Kurtchatov Institute Moscow

Anastasia Filina (2012-2015)

Explosive Phenomena in Astrophysics: Gamma-Ray Bursts and Supernovae

Now Anastasia is researcher in Keldysh Institute of Applied Mathematics Moscow.

II d Other Teaching Duties

Teaching activity at University of Savoie-PRES Université Grenoble

II e. Work With Postdocs

Mikhail Popov: Post-doc in LAPTH Annecy, then in CRAL ENS Lyon

III. Service activities [*activities carried out in collaboration with ICRANet (e.g. teaching activities, conferences etc...) and outside ICRANet (teaching activities in your university etc...)*]

III a. Within ICRANet

Coordinator of EMJD IRAP PhD Program

Co-Advisor of Giovanni Pisanni

III b. Outside ICRANet

Russian Institute for Advanced Study, Moscow

Project on Art and Science

IV. Other

Project of Joint Euro Mediterranean Master on Big Data and Space Sciences with Emirates and Lebanon

2015 List of Publication

1) A.A. Baranov, P. Chardonnet, V.M. Chechetkin, A.A. Filina, M.V. Popov, **Aspherical Nucleosynthesis in the He-layer of a Core-collapse Supernova Using the Tracer Particles Method, 2013**

The Astrophysical Journal Volume 783 page 43 (2014)

2) A.A. Baranov, P. Chardonnet, V.M. Chechetkin, A.A. Filina, M.V. Popov, **Multidimensional Simulations of Pair-Instability Supernovae, 2013**

Astronomy & Astrophysics Volume 558 page A10 (2013)

Meeting

P. Chardonnet , A.A. Baranov, V.M. Chechetkin, A.A. Filina, M.V. Popov,

Gamma-Ray Bursts appear simpler than expected ?

IOFFE Conference, September 21-27, 2014, Saint-Petersburg, Russia

P. Chardonnet , A.A. Baranov, V.M. Chechetkin, A.A. Filina, M.V. Popov,

Cosmic Gamma-Ray Bursts from Primordial Stars: a new Renaissance in Astrophysics ?

Fourth Galileo-Xu Guangqi Meeting, May 5-8-, 2015, Beijing, China

P. Chardonnet , A.A. Baranov, V.M. Chechetkin, A.A. Filina, M.V. Popov,

On Gamma-Ray Bursts Spectra: a possible understanding

2nd Cesar Lattes Meeting, April 13-18, 2015, Rio de Janeiro Brazil

P. Chardonnet

Artium Mater in Relativistic Astrophysics: new perspective for a European-Latin American PhD Program

2nd Cesar Lattes Meeting, April 13-18, 2015, Rio de Janeiro Brazil

CherubiniChristian

Position: Associate Professor in Mathematical Physics (MAT/07).
Engineering Departmental Faculty, University “Campus Bio-Medico”, Via A. del Portillo 21, I-001285 Rome, Italy
And
Adjunct Professor in ICRANet Faculty.

Period covered: position at ICRANet started on September 11th 2017



I Scientific Work

- Astrophysics of self-gravitating fluids.
- Electrodynamics round black holes.
- Numerical Relativity.
- Fluid dynamics and analogue gravity
- Theoretical biophysics.

II Conferences and educational activities

II a Conferences and Other External Scientific Work

- Scientific Meeting GNFM (May 4th 2017-May 6th 2017), Montecatini (Italy)
- Fifth Bego Rencontres (May 15th 2017-May 19th 2017), Nice (France) e Rome (Italy)

II b Work With Students

At the moment Prof. Cherubini, together with Prof. S. Filippi, Prof. Ruffini and Prof. Xue, is working with the ICRANet PhD students Rahim Moradi and Wang Yu on problems of black hole magnetohydrodynamics around Kerr black holes and other aspect of the mathematical theory of black holes.

II c Diploma thesis supervision

II d Other Teaching Duties

II e. Work With Postdocs

III. Service activities [activities carried out in collaboration with ICRANet (e.g. teaching activities, conferences etc...) and outside ICRANet (teaching activities in your university etc...)]

III a. Within ICRANet

- Participation to the "Collegio di Dottorato" of the INTERNATIONAL RELATIVISTIC ASTROPHYSICS PH.D."
- Faculty Member of the Fifth Bego Rencontres (May 15th 2017-May 19th 2017), Nice (France) e Rome (Italy)

III b. Outside ICRANet

- Lecturer "Electromagnetism" (Engineering Departmental Faculty, University Campus Bio-Medico of Rome).
- Lecturer "Mathematical Physics Models for Engineering" (Engineering Departmental Faculty, University Campus Bio-Medico of Rome).

IV. Other

Prof. Cherubini has a longstanding collaboration with other ICRANET scientists. In particular in collaboration with Dr Andrea Geralico, Dr Donato Bini, Prof. Robert T Jantzen, Prof. Remo Ruffini and Dr. J Rueda, he has written several articles in various areas of General Relativity. With Prof. Simonetta Filippi he is involved in research activities in the fields of Stellar and Galactic Structures, Effective Geometries and Complex Systems in Nature.

2017 List of Publication

- Gizzi A, Loppini A, Cherry EM, Cherubini C, Fenton FH, Filippi S (2017). *Multi-band decomposition analysis: application to cardiac alternans as a function of temperature*. *PHYSIOLOGICAL MEASUREMENT*, vol. 38, p.833-847, ISSN: 0967-3334, doi: <https://doi.org/10.1088/1361-6579/aa64af>
- Rueda JA, Aimuratov Y, Barres de Almeida U, Becerra L, Bianco CL, Cherubini C, Filippi S, Karlica M, Kovacevic M, Melon Fuksman J D, Moradi R, Muccino M, Penacchioni AV, Pisani GB, Primorac D, Ruffini R, Sahakyan N, Shakeri S, Wang Y (2017). *The binary systems associated with short and long gamma-ray bursts and their detectability*. *INTERNATIONAL JOURNAL OF MODERN PHYSICS D*, vol. 26, p.1730016-1-1730016-19, ISSN: 0218-2718, doi: DOI:10.1142/S0218271817300166
- Gizzi A, Loppini A, Ruiz-Baier R, Ippolito A, Camassa A, La Camera A, Emmi E, Di Perna L, Garofalo V, Cherubini C, Filippi S (2017). *Nonlinear diffusion and thermo-electric coupling in a two-variable model of cardiac action potential*. *CHAOS*, vol. 27, p. 093919-1-093919-11, ISSN:1054-1500, doi: doi: 10.1063/1.4999610
- Cherubini C, Filippi S, Gizzi A, Ruiz-Baier R (2017). *A note on stress-driven anisotropic diffusion and its role in active deformable media*. *JOURNAL OF THEORETICAL BIOLOGY*, vol. 430, p. 221-228, ISSN: 0022-5193, doi: <http://dx.doi.org/10.1016/j.jtbi.2017.07.013>

- Cipolletta F, Cherubini C, Filippi S, Rueda j A and Ruffini R (2017). *Last stable orbit around rapidly rotating neutron stars*. PHYSICAL REVIEW D, vol. 96, p. 024046-1-024046-10, ISSN: 2470-0010, doi:10.1103/PhysRevD.96.024046
- Gizzi A, Giannitelli SM, Trombetta M, Cherubini C, Filippi S, De Ninno A, Businaro L, Gerardino A, Rainer A (2017). *Computationally Informed Design of a Multi-Axial Actuated Microfluidic Chip Device*. SCIENTIFIC REPORTS, vol. 7, p. 1-11, ISSN: 2045-2322, doi:10.1038/s41598-017-05237-9
- Cipolletta F, Cherubini C, Filippi S, Rueda J A, Ruffini R (2017). *Equilibrium Configurations of Classical Polytropic Stars with a Multi-Parametric Differential Rotation Law: A Numerical Analysis*. COMMUNICATIONS IN COMPUTATIONAL PHYSICS, vol. 22, p. 863-888, ISSN: 1991-7120, doi:doi: 10.4208/cicp.OA-2017-0007

Filippi Simonetta

Position: Full Professor in Mathematical Physics (MAT/07).

Head, Laboratory of Non Linear Physics and Mathematical Modeling

Pro-Rector for Education, University “Campus Bio-Medico”,

Via A. del Portillo 21, I-001285 Rome, Italy,

Tel. +39-06-225419611

and

Adjunct Professor in ICRANet Faculty.



Period covered: position at ICRANet started on September 12th 2017

I Scientific Work

- Astrophysics of self-gravitating fluids.
- Electrodynamics round black holes.
- Numerical Relativity.
- Fluid dynamics and analogue gravity
- Theoretical biophysics.

II Conferences and educational activities

II a Conferences and Other External Scientific Work

- Scientific Meeting GNFM (May 4th 2017-May 6th 2017), Montecatini (Italy)

II b Work With Students

Prof. Filippi, together with Prof. C. Cherubini, Prof. Ruffini and Prof. Xue, is working with the ICRANet PhD students Rahim Moradi and Wang Yu on problems of relativistic magnetohydrodynamics around Kerr black holes.

II c Diploma thesis supervision

II d Other Teaching Duties

II e. Work With Postdocs

III. Service activities [activities carried out in collaboration with ICRANet (e.g. teaching activities, conferences etc...) and outside ICRANet (teaching activities in your university etc...)]

III a. Within ICRANet

Prof. Filippi serves as supervisor for IRAP PhD students.

III b. Outside ICRANet

- Lecturer “Dynamics of Complex Systems” (Engineering Departmental Faculty, University Campus Bio-Medico of Rome).
- Lecturer “Mathematical Physics Models for Engineering” (Engineering Departmental Faculty, University Campus Bio-Medico of Rome).
- Faculty of the “Science and Engineering for Humans and the Environment PH.D “ by University Campus Bio-Medico of Rome.

IV. Other

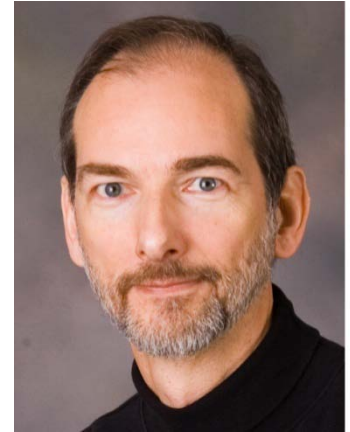
Prof. Filippi has a longstanding collaboration with ICRANET scientists. In particular in collaboration with Prof. Remo Ruffini she has written several articles on various aspects of Gravitational Physics. With Prof. Christian Cherubini, Dr Jorge Rueda, Dr Andrea Geralico and Dr Donato Bini she has been involved in research activities in the fields of Stellar and Galactic Structures, Effective Geometries and Complex Systems in Nature.

2017 List of Publication

- Gizzi A, Loppini A, Cherry EM, Cherubini C, Fenton FH, Filippi S (2017). *Multi-band decomposition analysis: application to cardiac alternans as a function of temperature*. PHYSIOLOGICAL MEASUREMENT, vol. 38, p.833-847, ISSN: 0967-3334, doi: <https://doi.org/10.1088/1361-6579/aa64af>
- Rueda JA, Aimuratov Y, Barres de Almeida U, Becerra L, Bianco CL, Cherubini C, Filippi S, Karlica M, Kovacevic M, Melon Fuksman J D, Moradi R, Muccino M, Penacchioni AV, Pisani GB, Primorac D, Ruffini R, Sahakyan N, Shakeri S, Wang Y (2017). *The binary systems associated with short and long gamma-ray bursts and their detectability*. INTERNATIONAL JOURNAL OF MODERN PHYSICS D, vol. 26, p.1730016-1-1730016-19, ISSN: 0218-2718, doi: DOI:10.1142/S0218271817300166
- Gizzi A, Loppini A, Ruiz-Baier R, Ippolito A, Camassa A, La Camera A, Emmi E, Di Perna L, Garofalo V, Cherubini C, Filippi S (2017). *Nonlinear diffusion and thermo-electric coupling in a two-variable model of cardiac action potential*. CHAOS, vol. 27, p. 093919-1-093919-11, ISSN:1054-1500, doi: doi: 10.1063/1.4999610
- Cherubini C, Filippi S, Gizzi A, Ruiz-Baier R (2017). *A note on stress-driven anisotropic diffusion and its role in active deformable media*. JOURNAL OF THEORETICAL BIOLOGY, v.430, p.221-228, ISSN:0022-5193, doi:<http://dx.doi.org/10.1016/j.jtbi.2017.07.013>
- Cipolletta F, Cherubini C, Filippi S, Rueda J A and Ruffini R (2017). *Last stable orbit around rapidly rotating neutron stars*. PHYSICAL REVIEW D, vol. 96, p. 024046-1-024046-10, ISSN: 2470-0010, doi:10.1103/PhysRevD.96.024046

- Gizzi A, Giannitelli SM, Trombetta M, Cherubini C, Filippi S, De Ninno A, Businaro L, Gerardino A, Rainer A (2017). *Computationally Informed Design of a Multi-Axial Actuated Microfluidic Chip Device*. SCIENTIFIC REPORTS, vol. 7, p. 1-11, ISSN: 2045-2322, doi:10.1038/s41598-017-05237-9
- Cipolletta F, Cherubini C, Filippi S, Rueda J A, Ruffini R (2017). *Equilibrium Configurations of Classical Polytropic Stars with a Multi-Parametric Differential Rotation Law: A Numerical Analysis*. COMMUNICATIONS IN COMPUTATIONAL PHYSICS, vol. 22, p. 863-888, ISSN: 1991-7120, doi:doi: 10.4208/cicp.OA-2017-0007
- Nestola M G C, Faggiano E, Vergara C, Lancellotti R M, Ippolito S, Antona C, Filippi S, Quarteroni A, Scrofani R (2017). *Computational comparison of aortic root stresses in presence of stentless and stented aortic valve bio-prostheses*. COMPUTER METHODS IN BIOMECHANICS AND BIOMEDICAL ENGINEERING, vol. 20, p. 171-181, ISSN: 1025-5842, doi: 10.1080/10255842.2016.1207171
- Bianchi D, Monaldo E, Gizzi A, Marino M, Filippi S, Vairo G (2017). *A FSI computational framework for vascular physiopathology: A novel flow-tissue multiscale strategy*. MEDICAL ENGINEERING & PHYSICS, vol. 47, p. 25-37, ISSN: 1350-4533, doi: 10.1016/j.medengphy.2017.06.028
- Loppini A, Pedersen M, Braun M, Filippi S (2017). *Gap-junction coupling and ATP-sensitive potassium channels in human β -cell clusters: Effects on emergent dynamics*. PHYSICAL REVIEW. E, vol. 96, p. 032403-1 - 032403-12, ISSN: 2470-0045, doi: 10.1103/PhysRevE.96.032403

Jantzen, Robert



Position: **Professor**

Period covered: **2017**

I Scientific Work

Ongoing collaboration with Donato Bini on mathematical properties of stationary spacetimes

II Conferences and educational activities

II a Conferences and Other External Scientific Work

MG14 Editing duties

II b Work With Students

II c Diploma thesis supervision

II d Other Teaching Duties

II e. Work With Postdocs

III. Service activities [*activities carried out in collaboration with ICRAANet (e.g. teaching activities, conferences etc...) and outside ICRAANet (teaching activities in your university etc...)*]

III a. Within ICRAANet

MG14 Editing duties

III b. Outside ICRAANet

IV. Other

2017 List of Publications

[145.](#) Gyroscope precession along general orbits around a Kerr black hole

D. Bini, A. Geralico and R.T. Jantzen
Phys. Rev. D 95, 124022 (2017).

[146.](#) Position determination and strong field parallax effects for photon emitters in the Schwarzschild spacetime

D. Bini, A. Geralico and R.T. Jantzen
GRG 49, 151 (2017).

- [147.](#) Proceedings of the Fourteenth Marcel Grossmann Meeting on General Relativity (2015)
M. Bianchi, R.T. Jantzen, R. Ruffini, Eds.,
World Scientific, Singapore, 2017.

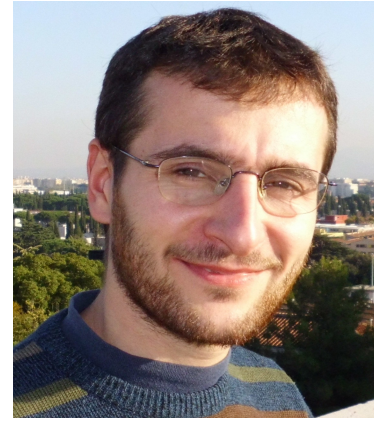
Marco Muccino

Position: PhD

Period covered: 2010/2014

Position: Post-Doc

Period covered: 2014/2016



I. Scientific Work

My research area includes:

- *data reduction of GRBs, from Swift-BAT and XRT, Fermi-GBM and LAT and BATSE by using XSPEC, RMFIT, and the Swift-BAT and XRT pipelines to create spectra and light curves;*
- *analysis and classification of short GRBs and quest of related progenitor systems as neutron star–neutron star (NS–NS) or NS–white dwarf (WD) mergers in the contest of the Fireshell model;*
- *analysis and classification of long GRBs and application of the "Induced gravitational collapse" (IGC) model, proposed to explain the GRBs-supernovae (SNe) connection;*
- *analysis of the X-ray afterglow of long and short GRBs;*
- *analysis of the high energy spectral component of short and long GRBs;*
- *cosmology with GRBs.*

II. Conferences and educational activities

II a. Conferences:

- 1) IRAP Ph.D. Erasmus Mundus Workshop “Recent News from the MeV, GeV and TeV Gamma-Ray Domains”, March 21st – 26th, 2011 Pescara (Italy)
- 2) IRAP Ph.D. Erasmus Mundus school, May 25th – June 10th, 2011 Nice (France)
- 3) HEPRO (High Energy Phenomena in Relativistic Outflows) III, June 27th – July 1st, 2011 Barcelona (Spain)
- 4) 12th Italian-Korean Symposium on Relativistic Astrophysics, July 4th – 8th, 2011 Pescara (Italy)
- 5) IRAP Ph Erasmus Mundus School, September 5th – 16th, 2011 Nice (France)
- 6) IRAP Ph.D. Erasmus Mundus Workshop, “Gamma Ray Bursts, their progenitors and the role of thermal emission”, October 2nd – 7th, 2011 Les Houches (France)
- 7) Third Galileo - Xu Guangqi meeting, “THE SUN, THE STARS, THE UNIVERSE and GENERAL RELATIVITY”, October 11th – 15th, 2011 Beijing (China)
- 8) 9th AGILE Science Workshop, Astrophysics with AGILE: Five Years of Surprises, April 16th – 17th, 2012 ESA-ESRIN, Frascati (Italy)
- 9) Thirteenth Marcel Grossmann Meeting (MG 13), “On Recent Developments on Theoretical and Experimental General Relativity, Astrophysics and Relativistic Field Theories”, July 1st – 7th, 2012 Stockholm (Sweden)
- 10) IRAP Ph.D. Erasmus Mundus School, September 3rd – 21st, 2012 Nice (France)

- 11) IRAP Ph.D. Erasmus Mundus School, May 16th – 31st, 2013 Nice (France).
- 12) 13th Italian-Korean Meeting on Relativistic Astrophysics, July 15th – 19th, 2013 Seoul (Korea).
- 13) IRAP Ph.D. Erasmus Mundus school, September 2nd – 20th, 2013 Nice (France).
- 14) XI International Conference on Gravitation, Astrophysics and Cosmology of Asia-Pacific Countries (ICGAC XI), October 1st – 5th, 2013 Almaty (Kazakhstan).
- 15) The 27th Texas Symposium on Relativistic Astrophysics, December 8th – 13th, 2013 Dallas (Texas, USA).
- 16) IRAP Ph.D. Erasmus Mundus School, February 23th – March 2nd, 2014 Nice (France).
- 17) Zeldovich-100 Meeting, “Subatomic particles, Nucleons, Atoms, Universe: Processes and Structure”, March 10th – 14th, 2014 Minsk (Belarus).
- 18) IRAP Ph.D. Erasmus Mundus Workshop, “Supernovae, Gamma-ray bursts and the induced gravitational collapse”, May 11th – 16th, 2014 Les Houches (France).
- 19) 1st Scientific ICRANet Meeting in Armenia, “Black Holes: the largest energy sources in the Universe”, June 30th – 4th July 2014 Yerevan (Armenia)
- 20) IRAP Ph.D. Erasmus Mundus school, September 8th – 19th, 2014 Nice (France).
- 21) The 2nd ICRANet Cesar Lattes Meeting, April 13th – 18th, 2015 Niteroi – Rio De Janeiro (Brazil).
- 22) Fourteenth Marcel Grossmann Meeting - MG14, July 12th – 18th, Rome (Italy).
- 23) 14th Italian-Korean Symposium on Relativistic Astrophysics", July 20th – 24th, Pescara (Italy)
- 24) “Supernovae, Hypernovae and Binary Driven Hypernovae”, An Adriatic Workshop, June 20th – 30th, Pescara (Italy)

II b. Work With Students:

Internal seminars and supervision of data analysis with the IRAP-PhD students.

III. Service activities

III a. Within ICRANet

- 1) *Lecture: IRAP Ph.D. Erasmus Mundus School, September 5th - 16th, 2011 Nice (France)*
“High Energy emission in GRBs: the case of GRB 090902B”
- 2) *Lecture: IRAP Ph.D. Erasmus Mundus School, September 3rd - 21st, 2012 Nice (France)*
“GRB090227B: the missing link between genuine short and long GRBs”

- 3) *Lecture: IRAP Ph.D. Erasmus Mundus School, May 16th-31st, 2013 Nice (France)*
“GRB 090510: A Disguised Short Gamma-Ray Burst with the Highest Lorentz Factor and Circumburst Medium”
- 4) *Lecture: IRAP Ph.D. Erasmus Mundus School, September 2nd–20th, 2013 Nice (France)*
“Data analysis of GRBs in the Fermi era”
- 5) *Lecture: IRAP Ph.D. Erasmus Mundus Winter School, February 23th–March 2nd, 2014 Nice (France)* *“On the Binary Driven Hypernovae and their nested X-ray afterglows”*
- 6) *Lectures: IRAP Ph.D. Erasmus Mundus school, September 8th–19th, 2014 Nice (France)*
 - a) *“Generalities of GRBs and short GRBs in the fireshell model”,*
 - b) *“The binary-driven hypernovae”*
- 7) *Lectures: IRAP Ph.D. Erasmus Mundus school, May 30th–June 2nd, 2016 Nice (France)*
“Classification of long and short bursts and their rate of occurrence”

III b. Outside ICRANet

December 2014. Set of lectures in Almaty (Kazakhstan) on GRBs for graduated and under-graduated students.

December 2015. Collaboration with Dr. Kuantay Boshkayev in Almaty (Kazakhstan).

February – September 2016. Collaboration with Dr. Luca Izzo.

IV. List of Publications, 2014–2016

- 1) *“Evidence for a proto-black hole and a double astrophysical component in GRB 101023”, A&A, 538, A58 (2012). A.V. Penacchioni, R. Ruffini, L. Izzo, M. Muccino, C.L. Bianco, L. Caito, B. Patricelli, L. Amati.*
- 2) *“GRB 090227B: the missing link between the genuine short and disguised short GRBs”, ApJ 763, 125 (2013); M. Muccino; R. Ruffini; C.L. Bianco; L. Izzo; A.V. Penacchioni.*
- 3) *“GRB 110709B in the induced gravitational collapse (IGC) paradigm”, A&A, 551, A133 (2013); A.V. Penacchioni, R. Ruffini, C.L. Bianco, L. Izzo, M. Muccino, G.B. Pisani, J. A. Rueda.*
- 4) *“On a novel distance indicator for Gamma-Ray Bursts associated with Supernovae”, A&A, 52L, 5 (2013); G.B. Pisani, L. Izzo, R. Ruffini, C.L. Bianco, M. Muccino, A.V. Penacchioni, J. A. Rueda, Y. Wang.*
- 5) *“GRB 090510: A Disguised Short Gamma-Ray Burst with the Highest Lorentz Factor and*

- Circumburst Medium*”, *ApJ*, 772, 62 (2013); M. Muccino, R. Ruffini, C.L. Bianco, L. Izzo, A.V. Penacchioni, G.B. Pisani.
- 6) “On binary-driven hypernovae and their nested late X-ray emission”, *A&A*, 565, L10 (2014); R. Ruffini, M. Muccino, C. L. Bianco, M. Enderli, L. Izzo, M. Kovacevic, A. V. Penacchioni, G. B. Pisani, J. A. Rueda, Y. Wang.
 - 7) “Induced gravitational collapse at extreme cosmological distances: the case of GRB 090423”, *A&A*, 569, A39, (2014); R. Ruffini, L. Izzo, M. Muccino, G. B. Pisani, J. A. Rueda, Y. Wang, C. Barbarino, C. L. Bianco, M. Enderli, M. Kovacevic.
 - 8) “A search for Fermi bursts associated with supernovae and their frequency of occurrence”, *A&A*, 569, A108 (2014); M. Kovacevic, L. Izzo, Y. Wang, M. Muccino, M. Della Valle, L. Amati, C. Barbarino, M. Enderli, G. B. Pisani, L. Li.
 - 9) “GRB 130427A and SN 2013cq: A Multi-wavelength Analysis of An Induced Gravitational Collapse Event”, *ApJ*, 798, 10 (2015); R. Ruffini, Y. Wang, M. Kovacevic, C. L. Bianco, M. Enderli, M. Muccino, A. V. Penacchioni, G. B. Pisani, J. A. Rueda.
 - 10) “Extracting multipole moments of neutron stars from quasi-periodic oscillations in low mass X-ray binaries”, *Astronomy Reports*, 59, 441 (2015); K. Boshkayev, J.A. Rueda, M. Muccino.
 - 11) “On binary driven hypernovae and their nested late X-ray emission”, *Astronomy Reports*, 59, 581 (2015); M. Muccino, R. Ruffini, C. L. Bianco, M. Enderli, M. Kovacevic, L. Izzo, A. V. Penacchioni, G. B. Pisani, J. A. Rueda, Y. Wang.
 - 12) “Induced gravitational collapse in the BATSE era: The case of GRB 970828”, *Astronomy Reports*, 59, 626 (2015); R. Ruffini, L. Izzo, C. L. Bianco, J. A. Rueda, C. Barbarino, H. Dereli, M. Enderli, M. Muccino, A. V. Penacchioni, G. B. Pisani, Y. Wang.
 - 13) “Predicting supernova associated to gamma-ray burst 130427a”, *Astronomy Reports*, 59, 667 (2015); Y. Wang, R. Ruffini, K. Kovacevic, C. L. Bianco, M. Enderli, M. Muccino, A. V. Penacchioni, G. B. Pisani, J. A. Rueda.
 - 14) “GRB 140619B: a short GRB from a binary neutron star merger leading to black hole formation”, *ApJ*, 808, 190 (2015); R. Ruffini, M. Muccino, M. Kovacevic, F. G. Oliveira, J. A. Rueda, C. L. Bianco, M. Enderli, A. V. Penacchioni, G. B. Pisani, Y. Wang, E. Zaninoni.
 - 15) “New measurements of Ω_m from gamma-ray bursts”, *A&A*, 582, A115 (2015); L. Izzo, M. Muccino, E. Zaninoni, L. Amati, M. Della Valle.
 - 16) “On the occurrence rate of short and long GRBs”, *ApJ* (in press), *arXiv:1602.02732* (2016); R. Ruffini, J. A. Rueda, M. Muccino, L. M. Becerra, G. B. Pisani, M. Kovacevic, Y. Wang, Y. Aimuratonov, C. L. Bianco, R. Moradi, F. G. Oliveira.
 - 17) “GRB 090510: a genuine short GRB from a binary neutron star coalescing into a Kerr-Newman black hole”, *ApJ* (in press), *arXiv:1607.02400* (2016); R. Ruffini, M. Muccino,

*Y. Aimuratov, C. L. Bianco, C. Cherubini, M. Enderli, M. Kovacevic, R. Moradi,
A. V. Penacchioni, G. B. Pisani, J. A. Rueda, Y. Wang.*

- 18) *“Theoretical and observational constraints on the mass-radius relations of neutron stars”,
arXiv:1606.07804 (2016); K. Boshkayev, J. A. Rueda, M. Muccino.*
- 19) *“Main parameters of neutron stars from quasi-periodic oscillations in low mass X-ray
binaries”, arXiv:1604.02398 (2016); K. Boshkayev, J. A. Rueda, M. Muccino.*
- 20) *“On the rate and on the gravitational wave emission of short and long GRBs”,
arXiv:1602.03545 (2016); R. Ruffini, J. Rodriguez, M. Muccino, J. A. Rueda, Y. Aimuratov,
U. Barres de Almeida, L. Becerra, C. L. Bianco, C. Cherubini⁶, S. Filippi, D. Gizzi,
M. Kovacevic, R. Moradi, F. G. Oliveira, G. B. Pisani, Y. Wang.*

Pisani Giovanni Battista

Position: Post-Doc Researcher at Sapienza University of Rome, Rome, Italy and ICRANet, Pescara, Italy

Period covered: 1st April 2015 – Today



I Scientific Work

Gamma Ray Bursts (GRBs) are among the most puzzling astronomical objects since their first detection by the Vela satellites in the late 1960s. GRBs are flashes in gamma-rays observed in distant galaxies. They can last from milliseconds to several minutes with an isotropic energy released up to the order of one solar mass. This peculiarity makes them the most powerful events ever observed in the Universe. A variety of models have been developed to theoretically explain the observational properties of GRBs.

My PhD research project includes the reduction and analysis of GRBs data from different satellites, such as Batse, Swift or Fermi. I investigate GRBs observations within the fireshell model scenario, which predicts that GRBs originate from an optically thick e^+e^- plasma at thermal equilibrium created by vacuum polarization during the formation of a Black Hole.

My attention is focused on GRBs associated with Supernovae (SN). Since the first discovery of this association (GRB 980425 - SN1998wt), various mechanisms have been proposed to explain it. Recently Prof. Ruffini and his collaborators have proposed the Induced Gravitational Collapse (IGC) occurring in a particular class of binary systems as progenitors for the GRB-SN sources having a released isotropic energy above 10^{52} ergs. We refer to such phenomena as Binary-driven HyperNovae (BdHNe). Together with them we are further developing the BdHN paradigm and enlarging the sample of BdHN candidates. One of the most exciting outcomes of this work is the possibility to consider this class of BdHN events as a standard candle. If confirmed, this result could provide new independent challenges on the current cosmological model back to 600 millions years only after the Big Bang.

During my current Post-Doc research project, basing on my Ph.D. thesis results, I am focusing on building a complete sample of BdHNe looking at redshifts larger than $z \sim 1$, in order to drastically enlarge our current sample and to confirm that the standard candle hypothesis holds at larger cosmological distances. My recent analysis on a complete sample of 161 BdHNe, observed by the Swift satellite up to the end of 2015, points to a non-spherical emission of the late X-ray of BdHNe which is supposedly generated by the young SN remnant. This result is in agreement with the observations of non-spherical SN remnants.

II Conferences and educational activities

II a Conferences and Other External Scientific Work

- 1) “Erasmus Mundus School”, Nice, France, 5th - 17th September, 2011;
- 2) “IRAP Erasmus Mundus Workshop”, Les Houches, France, 2nd - 6th October, 2011;
- 3) “Third Galileo-Xu Guangqi” meeting, Beijing, China, 11th- 15th October, 2011;
- 4) “Fermi/Swift GRB 2012 Conference”, Munich, Germany, 7th – 11th May, 2012;
- 5) “Erasmus Mundus School”, Nice, France, 4th – 8th June, 2012;
- 6) “13th Marcel Grossmann Meeting”, Stockholm, Sweden, 1st - 7th July, 2012;
- 7) “Erasmus Mundus School”, Nice, France, 3rd – 19th September, 2012;
- 8) III National Congress “Lampi su Napoli”, Naples, Italy, 20th - 22nd September, 2012;
- 9) “The Current Issues on Relativistic Astrophysics”, 5th - 6th October, 2012, Seoul, South Korea;
- 10) “7th Huntsville GRB Symposium”, Nashville TN, USA, 14th – 18th April, 2013;
- 11) “2nd Bego Rencontres”, Nice, France, 16th – 31st May, 2013;
- 12) “2013 yearly ICRANet Scientific Meeting on Relativistic Astrophysics”, Pescara, Italy, 3rd – 21th June, 2013;
- 13) “1st URCA Meeting on Relativistic Astrophysics”, Rio de Janeiro, Brasil, 24th – 29th June, 2013;
- 14) “13th Italian-Korean Symposium on Relativistic Astrophysics”, Seoul, South Korea, 15th – 19th July, 2013;
- 15) “Erasmus Mundus School”, Nice, France, 3rd – 20th September, 2013;
- 16) “27th Texas Meeting on Relativistic Astrophysics”, Dallas TX, USA, 8th - 13th, December 2013;
- 17) “Erasmus Mundus School”, Nice, France, 23rd - 27th February, 2014;
- 18) “Erasmus Mundus School”, Les Houches, France, 11th - 16th May, 2014;
- 19) “1st Scientific ICRANet Meeting in Armenia”, Yerevan, Armenia, 30th June - 4th July, 2014.
- 20) “3rd Bego Rencontres”, Nice, France, 8th – 19th September, 2014;
- 21) “Swift: 10 Years of Discovery”, Rome, Italy, 2nd – 5th December, 2015;
- 22) “2nd Cesar Lattes Meeting”, Rio de Janeiro, Brazil, 10th – 20th April, 2015;
- 23) “The XIV Marcel Grossmann Meeting”, Rome, Italy, 13th – 17th July, 2015;
- 24) “The 14th Italian-Korean Symposium on Relativistic Astrophysics”, Pescara, Italy, 20th – 24th July, 2015;
- 25) “4th Bego Rencontres”, Nice, France, 30th May – 3rd June, 2016;
- 26) “Supernovae, Hypernovae, and Binary-driven HyperNovae: an Adriatic Workshop”, Pescara, Italy, 20th – 27th June, 2016;

II b Work With Students

Co-tutoring of Erasmus Mundus Ph.D. Students: Milos Kovacevic and Daria Primorac.

II c Diploma thesis supervision

II d Other Teaching Duties

II e. Work With Postdocs

III. Service activities [*activities carried out in collaboration with ICRANet (e.g. teaching activities, conferences etc...) and outside ICRANet (teaching activities in your university etc...)*]

III a. Within ICRANet

Teaching activities for international Ph.D. Schools organized by ICRANet. List of schools and lectures:

1) “Erasmus Mundus School”, Nice, France, 4th – 8th June, 2012;

Lecture: A new interpretation for the disguised short GRB 060614; G. B. Pisani, R. Ruffini, C.L. Bianco, L. Izzo, J. A. Rueda, M. Muccino, A. V. Penacchioni.

2) “Erasmus Mundus School”, Nice, France, 3rd – 19th September, 2012;

Lecture: The class of “disguised” short GRBs within the fireshell model and the particular case of GRB 060614; G. B. Pisani, R. Ruffini, C.L. Bianco, L. Izzo, M. Muccino, A. V. Penacchioni;

3) “2nd Bego Rencontres”, Nice, France, 16th – 31st May, 2013;

Lecture: A new subclass of energetic GRB-SN sources: The IGC GRB-SN family; G. B. Pisani, R. Ruffini, C.L. Bianco, L. Izzo, M. Muccino, A. V. Penacchioni, J. A. Rueda.

4) “Erasmus Mundus School”, Nice, France, 3rd – 20th September, 2013;

Lecture: A new subclass of energetic GRB-SN sources: The IGC GRB-SN family; G. B. Pisani, R. Ruffini, C.L. Bianco, L. Izzo, M. Muccino, A. V. Penacchioni, J. A. Rueda.

5) “Erasmus Mundus School”, Nice, France, 23rd - 27th February, 2014;

Lecture 1: GRBs-SNe within the Induced Gravitational Collapse model; G. B. Pisani, R. Ruffini, C.L. Bianco, M. Enderli, L. Izzo, M. Kovacevic, M. Muccino, A. V. Penacchioni, J. A. Rueda, Y. Wang;

Lecture 2: The role of the High Energy in short and long GRBs; G. B. Pisani, R. Ruffini, C.L. Bianco, M. Enderli, L. Izzo, M. Kovacevic, M. Muccino, A. V. Penacchioni, J. A. Rueda, Y. Wang.

6) “Erasmus Mundus School”, Les Houches, France, 11th - 16th May, 2014;

Lecture: GRBs-SNe within the Induced Gravitational Collapse model: towards a new standard candle; G. B. Pisani, R. Ruffini, C.L. Bianco, M. Enderli, L. Izzo, M. Kovacevic, M. Muccino, A. V. Penacchioni, J. A. Rueda, Y. Wang.

7) “3rd Bego Rencontres”, Nice, France, 8th – 19th September, 2014;

Lecture: Energetic GRBs-SNe within the Induced Gravitational Collapse; G. B. Pisani, R. Ruffini, C.L. Bianco, M. Enderli, L. Izzo, M. Kovacevic, M. Muccino, A. V. Penacchioni, J. A. Rueda, Y. Wang;

8) “4th Bego Rencontres”, Nice, France, 30th May – 3rd June, 2016;

Lecture: Properties of the X-ray afterglow of Binary-driven HyperNovae; G. B. Pisani, R. Ruffini, Y. Aimuratov, C.L. Bianco, M. Enderli, L. Izzo, M. Kovacevic, M. Muccino, A. V. Penacchioni, J. A. Rueda, Y. Wang.

III b. Outside ICRANet

- Academic Year 2015/2016:

Teaching activity as assistant of Professor Valerio Parisi in his “Medical Physics” classes for Medical Science students, Sapienza University of Rome;

- Academic Year 2016/2017:

Teaching activity as assistant of Professor Valerio Parisi in his “Medical Physics” classes for Medical Science students, Sapienza University of Rome;

- Academic Year 2017/2018:

Teaching activity as assistant of Doctor Stefano Sarti in his “Physics II” classes for Environmental and Geomatic Engineering students, Sapienza University of Rome.

IV. Other

2017 List of Publication

- Ruffini R., Rodriguez J., Muccino M., Rueda J.A, Aimuratov Y., Barres de Almeida U., Becerra L.M., Bianco C.L., Cherubini C., Filippi S., Gizzi D., Kovacevic M., Moradi R., Oliveira F.G., Pisani G.B., Wang Y., “On the rate and on the gravitational wave emission of short and long GRBs”, submitted to Astrophysical Journal, arXiv:1602.03545
- Ruffini, R.; Aimuratov, Y.; Becerra, L.; Bianco, C. L.; Karlica, M.; Kovacevic, M.; Melon Fuksman, J. D.; Moradi, R.; Muccino, M.; Penacchioni, A. V.; Pisani, G. B.; Primorac, D.; Rueda, J. A.; Shakeri, S.; Vereshchagin, G. V.; Wang, Y.; Xue, S.-S., “The cosmic matrix in the 50th anniversary of relativistic astrophysics”, 2017, International Journal of Modern Physics D, 26, 1730019-367
- Rueda, Jorge A.; Aimuratov, Y.; de Almeida, U. Barres; Becerra, L.; Bianco, C. L.; Cherubini, C.; Filippi, S.; Karlica, M.; Kovacevic, M.; Fuksman, J. D. Melon; Moradi, R.; Muccino, M.; Penacchioni, A. V.; Pisani, G. B.; Primorac, D.; Ruffini, R.; Sahakyan, N.; Shakeri, S.; Wang, Y., “The binary systems associated with short and long gamma-ray bursts and their detectability”, 2017, International Journal of Modern Physics D, 26, 1730016-309
- Aimuratov, Y.; Ruffini, R.; Muccino, M.; Bianco, C. L.; Penacchioni, A. V.; Pisani, G. B.; Primorac, D.; Rueda, J. A.; Wang, Y., “GRB 081024B and GRB 140402A: Two Additional Short GRBs from Binary Neutron Star Mergers”, 2017, Astrophysical Journal, 844, 83

- Luongo O., Pisani G.B., Troisi A., “Cosmological degeneracy versus cosmography: a cosmographic dark energy model”, 2017, International Journal of modern physics D, 26, 1750015

Brian Punsly

Position: Research Scientist
Period covered: 10/2016-10/2017



I Scientific Work

Black Holes and Quasars

1. Introduction

This report describes the research performed by Brian Punsly and collaborators in cooperation with ICRANet in 2016-2017. The research was directed at finding environmental factors that are related to the switch-on of the general relativistic engine responsible for a few percent of quasars driving powerful relativistic jets. This is important since this will relate directly to constraints on the initial state and boundary conditions on numerical models of black hole driven jets.

2. The Origin of the Event Horizon Scale Jet in M87

Global millimeter wavelength Very Long Baseline Interferometry (VLBI) is an ambitious program to study the event horizon scale physics of nearby active galactic nuclei (AGN). The shortest wavelength receivers have been designated as the Event Horizon Telescope (EHT). It has been widely advertised that the experiment will reveal how astrophysical black holes can drive powerful jets near the event horizon – possibly proving the Blandford-Znajek mechanism that drives jets from the event horizon itself. There is only one powerful relativistic jet source that can be explored by the EHT with resolution on the order of the event horizon dimension, the jet in the enormous radio galaxy M87. Thus, M87 is the most studied object in radio jet research.

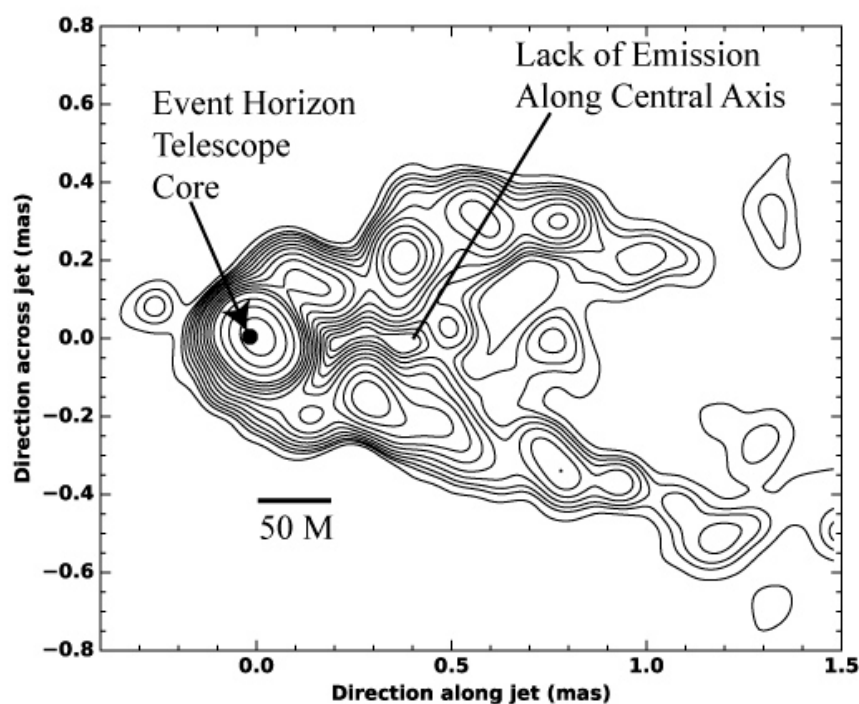


Figure 1. The 3.5 mm, global VLBI, image of Hada et al. (2016) with the EHT detected core at 1.3 mm from Akiyama et al. (2016) and Doeleman et al. (2012) overlaid. Note the extreme absence of emission along the central spine within 50 M of the black hole (the limit of the resolution of the radio image)

There is radio imaging of M87 at 3.5 mm (86 GHz) and detections with the EHT at 1.3 mm (230 GHz). The newest and most sensitive 86 GHz published image is shown in Figure 1. There is currently no imaging capability at 230 GHz. However, it seems clear from the 86 GHz image in Figure 1 that there is a flux void along the central spine above the event horizon. More specifically, the image reveals a central flux nadir within 50M (where M is the black hole in geometrized units) of the super-massive black hole.

ICRANet adjunct professor, Brian Punsly, has been collaborating with Kazuhiro Hada of Mizusawa VLBI Observatory, National Astronomical Observatory of Japan (the principal investigator on the 86 GHz observation in Figure 1) and Martin Hardcastle of Centre for Astrophysics Research, School of Physics, Astronomy and Mathematics, University of Hertfordshire in order to study this lack of emission along the spine. There are two papers. Paper 1 is a collaborative, “A New Solution to the Plasma Starved Event Horizon Magnetosphere: Application to the Forked Jet in M87”. It is currently under review with Astronomy and Astrophysics. It explains the physics that does not allow the event horizon magnetosphere to launch a powerful jet in M87, thereby producing the weak flux emission along the spine above the event horizon evident in Figure 1. This will be reported in detail in a future newsletter. In summary, for low luminosity AGN, such as M87, it is shown that accreted large scale poloidal magnetic flux is dissipated when it approaches the event horizon and no significant magnetosphere can be obtained.

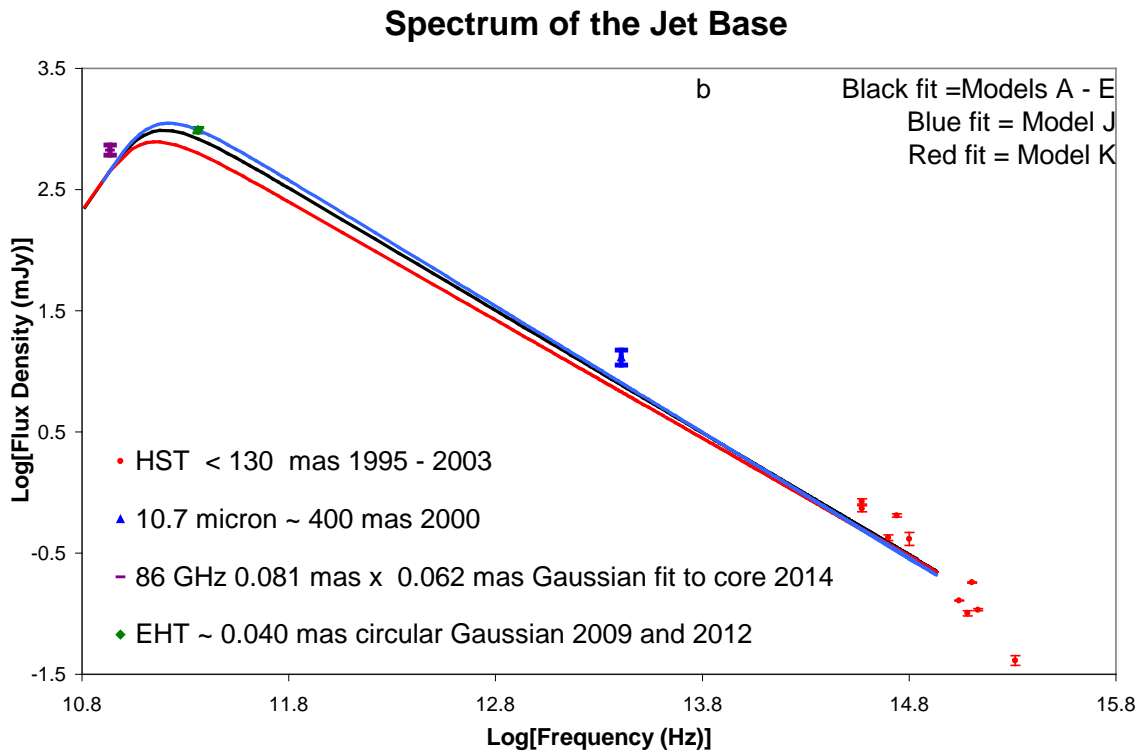


Figure 2. A hollow jet from the inner accretion can explain the broadband spectrum of the region that is the source of the correlated flux detected by the EHT (from Punsly 2018).

The second paper is a solo effort of Brian Punsly, “A Jet Source of Event Horizon Telescope Correlated Flux in M87” *ApJ* (2017). This is an important supporting work since it shows that a jet from the inner accretion flow can not only explain the broadband spectra from millimeter to the ultraviolet of the plasma responsible for the correlated flux detected by the EHT (see Figure 2), but it

also shows that such a jet can supply all the power required to explain the large scale jet in M87. This is critical because the Blandford-Znajek school claims that Figure 1 is an optical illusion. The horizon jet is far more powerful than the enveloping hollow jet, but is invisible on these scales due to a low plasma energy density. It can never be seen by any telescope, but works silently behind the scenes energizing the outer sheath and this is needed to explain the global energetics of the jet. However, the new ICRANet paper of Punsly shows that a jet from the inner accretion flow has plenty of power and no invisible powerful “ghost jet” is needed. Furthermore, the hollow jet is a direct interpretation of Figure 1 and the EHT correlated flux detection, neither of which is explained by a Blandford-Znajek “ghost jet”. There is a clear straightforward observation that could prove the EHT very valuable in this line of research. It is pointed out in Punsly (2017) that if a luminous forward jet is detected by future EHT observations on scales of less than 30 micro-arc-seconds, it would contradict the notion of a Blandford-Znajek jet and corroborate a prediction of the hollow jet with a void above the event horizon magnetosphere.

2017 List of Publication

Punsly, Brian; A Jet Source of Event Horizon Telescope Correlated Flux in M87 2017 ApJ 850 190

Punsly, Brian,, Kharb, Preeti The kinetically dominated quasar 3C 418 2017 MNRAS Lett. 468 72

Reynolds, Cormac; Punsly, Brian; Miniutti, Giovanni; O'Dea, Christopher P.; Hurley-Walker, Natasha., The Relativistic Jet-accretion Flow-Wind Connection in Mrk 231 2017 ApJ 836 155

Rueda Hernández, Jorge Armando

Position:

Faculty Professor at ICRANet

Member of ICRANet Faculty

IRAP PhD Faculty

Period covered: 2011-Present



I Scientific Work

I perform research in the following topics:

- Nuclear and atomic astrophysics.
- Physics and astrophysics of white dwarfs and neutron stars.
- Radiation mechanisms of white dwarfs and neutron stars.
- Gamma-ray bursts theory.
- Accretion disks, hypercritical accretion processes.
- Neutrino emission from astrophysical sources.
- Gravitational waves.
- Exact solutions of the Einstein and Einstein-Maxwell equations in astrophysics.
- Critical electromagnetic fields and non-linear electrodynamics effects in astrophysics.
- Distribution of dark matter in galaxies and cosmological implications.

II Conferences and educational activities

II a Conferences and Other External Scientific Work

In the year 2017 I presented lectures/talks in the following conferences/meetings/workshops:

- “Fifth Bego Rencontre”, IRAP Ph.D. Erasmus Mundus School, 15-19 May 2017, Nice (France).
- “The 2017 Annual meeting of the Division of Gravitation and Relativistic Astrophysics of the Chinese Physical Society”, 25-30 June 2017, Chengdu (China).
- “The Fifth Galileo-Xu Guangqi Meeting”, 25-30 June 2017, Chengdu (China).
- “XIII International Conference on Gravitation, Astrophysics and Cosmology”, 3-7 July 2017, Seoul (South Korea).
- “15th Italian-Korean Symposium on Relativistic Astrophysics”, 3-7 July 2017, Seoul (South Korea).
- “Vida después de la muerte: Estrellas de neutrones y las explosiones más potentes del Universo”, Invited Talk for the High School Instituto Antonino Nariño, 12 September 2017, Barrancabermeja (Colombia)

- “9th European Summer School on Experimental Nuclear Astrophysics”, 17-24 September 2017, Santa Tecla (Italy).
- “La notte europea dei ricercatori”, 29 September 2017, Pescara (Italy).
- “Theseus Workshop”, 5-6 October 2017, Naples (Italy).
- “¿Hacia dónde va la astronomía y la astrofísica en Colombia?”, Invited Talk at the 50th anniversary of the Physics Department of Universidad Industrial de Santander, 20 October 2017, Bucaramanga (Colombia).

II b Work With Students

- Current scientific collaboration with the following students of the IRAP-PhD program at Sapienza University of Rome, Italy: Yerlan Aimuratov, Laura Becerra, Stefano Campion, Milos Kovacevic, David Melon Fuksman, Jose Fernando Rodriguez, Juan David Uribe, Ronaldo Vieira Lobato, Yu Wang.

II c Diploma thesis supervision

I list below the undergraduate theses which I have supervised.

- Undergraduate Thesis of Davide Gizzi 2016, Sapienza University of Rome, Italy: “Gravitational wave emission of compact object binary mergers within the effective one-body formalism”

Scientific Production:

- R. Ruffini, J. F. Rodriguez, M. Muccino, J. A. Rueda, et al., “On the rate and on the gravitational wave emission of short and long GRBs”, arXiv:1602.03545.

- Undergraduate Physics thesis of Silvia Petroni 2016, Sapienza University of Rome, Italy: “Hypercritical neutrino-collided accretion onto black holes”

I list below the PhD theses which I have supervised and the ones currently under my supervision. They are distributed in the seven topics listed above in the section I. I also include some scientific production that derived from these PhD researches.

- PhD thesis of Juan David Uribe 2015-2018, Sapienza University of Rome, Italy. Topics: 1-4. Fellowship: IRAP-PhD

Scientific Production:

- L. Becerra, M. Guzzo, F. Rossi-Torres, J. A. Rueda, R. Ruffini, J. D. Uribe, “Neutrino Oscillations within the Induced Gravitational Collapse Paradigm of Long Gamma-Ray Bursts”, The Astrophysical Journal 852, 120 (2018).

- PhD thesis of Jose Fernando Rodriguez Ruiz 2014-2017, Sapienza University of Rome, Italy. Topics: 1-4. Fellowship: IRAP-PhD

Scientific Production:

- J. F. Rodriguez, J. A. Rueda, and R. Ruffini, “Comparison and contrast of test-particle and numerical-relativity waveform templates”, submitted to JCAP; arXiv:1706.07704

- J. F. Rodriguez, J. A. Rueda, and R. Ruffini, “Strong-field gravitational-wave emission in Schwarzschild and Kerr geometries: some general considerations”, submitted to Phys. Rev. D; arXiv:1706.06440
- R. Ruffini, J. F. Rodriguez, M. Muccino, J. A. Rueda, et al., “On the rate and on the gravitational wave emission of short and long GRBs”, submitted to ApJ, arXiv:1602.03545.

- *PhD thesis of Laura Becerra Bayona 2013-2016, Sapienza University of Rome, Italy. Topics: 1-4. Fellowship: IRAP-PhD*

Scientific Production:

- L. Becerra, M. Guzzo, F. Rossi-Torres, J. A. Rueda, R. Ruffini, J. D. Uribe, “Neutrino Oscillations within the Induced Gravitational Collapse Paradigm of Long Gamma-Ray Bursts”, ApJ 852, 120 (2018).
- R. Ruffini, J. F. Rodriguez, M. Muccino, J. A. Rueda, et al., “On the rate and on the gravitational wave emission of short and long GRBs”, submitted to ApJ; arXiv:1602.03545.
- L. Becerra, J. A. Rueda, P. Lorén-Aguilar, E. García-Berro, “The Spin Evolution of Fast-Rotating, Magnetized Super-Chandrasekhar White Dwarfs in the Aftermath of White Dwarf Mergers”, submitted to ApJ.
- R. Ruffini, J. A. Rueda, M. Muccino, Y. Aimuratov, L. M. Becerra, et al., “On the classification of GRBs and their occurrence rates,” ApJ 832, 136 (2016).
- L. Becerra, C. L. Bianco, C. L. Fryer, J. A. Rueda, and R. Ruffini, “On the induced gravitational collapse scenario of gamma-ray bursts associated with supernovae”, ApJ 833, 107 (2016).
- L. Becerra, F. Cipolletta, C. L. Fryer, J. A. Rueda, and R. Ruffini, “Angular Momentum Role in the Hypercritical Accretion of Binary-driven Hypernovae”, ApJ 812, 100 (2015).

- *PhD thesis of Luis Gabriel Gómez 2013-2016, Sapienza University of Rome, Italy and University of Nice Sophia-Antipolis, Nice, France. Topics: 7. Fellowship: Erasmus Mundus IRAP-PhD*

Scientific Production:

- L. G. Gomez and J. A. Rueda, “Dark-matter dynamical friction versus gravitational-wave emission in the evolution of compact-star binaries”, Phys. Rev. D 96, 063001 (2017).
- L. G. Gomez, C. R. Argüelles, P. Volker, J. A. Rueda, R. Ruffini, “Strong lensing by fermionic dark matter in galaxies”, Phys. Rev. D 94, 123004 (2016).
- L. G. Gomez and J. A. Rueda, “The Role of the Dark Matter Distribution in the Structure Formation”, Proc. Second César Lattes Meeting 2016.

- *PhD thesis of Fernanda Gomes Oliveira 2012-2015, Sapienza University of Rome, Italy and University of Nice Sophia-Antipolis, Nice, France. Topics: 2-4. Fellowship: Erasmus Mundus IRAP-PhD*

Scientific Production:

- C. L. Fryer, F. G. Oliveira, J. A. Rueda, and R. Ruffini, “Neutron-Star-Black-Hole Binaries Produced by Binary-Driven Hypernovae”, Phys. Rev. Lett., vol. 115, p. 231102, Dec. 2015.

- R. Ruffini, M. Muccino, M. Kovacevic, F. G. Oliveira, J. A. Rueda, C. L. Bianco, M. Enderli, A. V. Penacchioni, G. B. Pisani, Y. Wang, and E. Zaninoni, “GRB 140619B: a short GRB from a binary neutron star merger leading to black hole formation”, *ApJ*, vol. 808, p. 190, Aug. 2015.
- F. G. Oliveira, J. A. Rueda, and R. Ruffini, “X, Gamma-Rays, and Gravitational Waves Emission in a Short Gamma-Ray Burst” *Astrophysics and Space Science Proceedings*, vol. 40, p. 43, 2015.
- F. G. Oliveira, J. A. Rueda, and R. Ruffini, “Gravitational Waves versus X-Ray and Gamma-Ray Emission in a Short Gamma-Ray Burst”, *ApJ*, vol. 787, p. 150, June 2014.

- *PhD thesis of Diego Leonardo Cáceres Uribe 2011-2014, Sapienza University of Rome, Italy. Topics: 2 and 4. Fellowship: IRAP-PhD*

Scientific Production:

- D. L. Cáceres, S. M. de Carvalho, J. G. Coelho, R. C. R. de Lima, J. A. Rueda, “Thermal X-ray emission from massive, fast rotating, highly magnetized white dwarfs”, *MNRAS* 465, 4434 (2017).
- Jaziel G. Coelho, D. L. Cáceres, R. C. R. de Lima, M. Malheiro, J. A. Rueda, R. Ruffini “The rotation-powered nature of some SGRs and AXPs”, *A&A* 599, A87 (2017).
- J. G. Coelho, R. M. Marinho, M. Malheiro, R. Negreiros, D. L. Cáceres, J. A. Rueda, and R. Ruffini, “Dynamical Instability of White Dwarfs and Breaking of Spherical Symmetry Under the Presence of Extreme Magnetic Fields”, *ApJ* 794, 86 (2014).
- D. L. Cáceres, J. A. Rueda, and R. Ruffini, “On the stability of ultra-magnetized white dwarfs”, *Journal of Korean Physical Society* 65, 846 (2014).

- *PhD thesis of Jonas Pedro Pereira’s PhD 2011-2014, Sapienza University of Rome, Italy and University of Nice Sophia-Antipolis, Nice, France. Topics: 3 and 6. Fellowship: Erasmus Mundus IRAP-PhD*

Scientific Production:

- J. P. Pereira and J. A. Rueda, “Energy decomposition within Einstein-Born-Infeld black holes”, *Phys. Rev. D*, vol. 91, p. 064048, Mar. 2015.
- J. P. Pereira and J. A. Rueda, “Radial Stability in Stratified Stars”, *ApJ*, vol. 801, p. 19, Mar. 2015.
- J. P. Pereira, J. G. Coelho, and J. A. Rueda, “Stability of thin-shell interfaces inside compact stars”, *Phys. Rev. D*, vol. 90, p. 123011, Dec. 2014.
- J. P. Pereira, H. J. Mosquera Cuesta, J. A. Rueda, and R. Ruffini, “On the black hole mass decomposition in nonlinear electrodynamics”, *Physics Letters B*, vol. 734, pp. 396-402, June 2014.

- *PhD thesis of Carlos Raul Arguelles 2011-2014, Sapienza University of Rome, Italy. Topics: 7. Fellowship: IRAP-PhD*

Scientific Production:

- C. R. Arguelles, J. A. Rueda, and R. Ruffini, “Theoretical evidence of 50 keV fermionic dark matter from galactic observables”, submitted; arXiv:1606.07040.

- C. R. Argüelles, N. E. Mavromatos, J. A. Rueda, and R. Ruffini, “The role of self-interacting right-handed neutrinos in galactic structure,” JCAP, vol. 4, p. 038, Apr. 2016.
- R. Ruffini, C. R. Argüelles, and J. A. Rueda, “On the core-halo distribution of dark matter in galaxies,” MNRAS, vol. 451, pp. 622-628, July 2015.
- R. Ruffini, C. R. Argüelles, B. M. O. Fraga, A. Geralico, H. Quevedo, J. A. Rueda, and I. Siutsou, “Black Holes in Gamma Ray Bursts and Galactic Nuclei”, International Journal of Modern Physics D, vol. 22, p. 60008, Sept. 2013.

- PhD thesis of Sheyse Martins de Carvalho 2010-2013, Sapienza University of Rome, Italy and University of Nice Sophia-Antipolis, Nice, France. Topics: 1-3. Fellowship: Erasmus Mundus IRAP-PhD

Scientific Production:

- S. M. de Carvalho, J. A. Rueda, and R. Ruffini, “On the Relativistic Feynman-Metropolis Equation of State at Finite Temperatures”, Proc. Thirteenth Marcel Grossmann Meeting, pp. 2481-2483, Jan. 2015.
- S. M. de Carvalho, R. Negreiros, J. A. Rueda, and R. Ruffini, “Thermal evolution of neutron stars with global and local neutrality”, Phys. Rev. C, vol. 90, p. 055804, Nov. 2014.
- S. M. de Carvalho, J. A. Rueda, and R. Ruffini, “On the cooling of globally-neutral neutron stars”, Journal of Korean Physical Society, vol. 65, pp. 861-864, Sept. 2014.
- S. M. de Carvalho, M. Rotondo, J. A. Rueda, and R. Ruffini, “Relativistic Feynman-Metropolis-Teller treatment at finite temperatures”, Phys. Rev. C, vol. 89, p. 015801, Jan. 2014.
- S. M. de Carvalho, J. A. Rueda, M. Rotondo, C. Argüelles, and R. Ruffini, “The Relativistic Feynman Metropolis Teller Theory at Zero and Finite Temperatures”, International Journal of Modern Physics Conference Series, vol. 23, pp. 244-247, Jan. 2013.

- PhD thesis of Riccardo Belvedere 2008-2013, Sapienza University of Rome, Italy. Topics: 1, 3-4. Fellowship: IRAP-PhD

Scientific Production:

- R. Belvedere, J. A. Rueda, and R. Ruffini, “On the Magnetic Field of Pulsars with Realistic Neutron Star Configurations”, ApJ, vol. 799, p. 23, Jan. 2015.
- R. Belvedere, J. A. Rueda, and R. Ruffini, “Static and rotating neutron stars fulfilling all fundamental interactions”, Journal of Korean Physical Society, vol. 65, pp. 897-902, Sept. 2014.
- R. Belvedere, K. Boshkayev, J. A. Rueda, and R. Ruffini, “Uniformly rotating neutron stars in the global and local charge neutrality cases”, Nuclear Physics A, vol. 921, pp. 33-59, Jan. 2014.
- R. Belvedere, J. A. Rueda, and R. Ruffini, “Neutron Star Cores in the General Relativistic Thomas-Fermi Treatment”, International Journal of Modern Physics Conference Series, vol. 23, pp. 185-192, Jan. 2013.
- R. Belvedere, D. Pugliese, J. A. Rueda, R. Ruffini, and S.-S. Xue, “Neutron star equilibrium configurations within a fully relativistic theory with strong, weak, electromagnetic, and gravitational interactions”, Nuclear Physics A, vol. 883, pp. 1-24, June 2012.
- R. Belvedere, J. Rueda, and R. Ruffini, “Mass, Radius and Moment of Inertia of Neutron Stars”, Proc. X-ray Astrophysics up to 511 keV, p. 7, Sept. 2011.

- R. Belvedere, J. A. Rueda, R. Ruffini, and S.-S. Xue, “The influence of the core on the structure of the outer crust of neutron stars”, Proc. 25th Texas Symposium on Relativistic Astrophysics, p. 270, 2010.

- *PhD thesis of Kuantay Boshkayev 2009-2012, Sapienza University of Rome, Italy. Topics: 2-5. Fellowship: IRAP-PhD*

- K. Boshkayev, J. Rueda, and M. Muccino, “Extracting multipole moments of neutron stars from quasi-periodic oscillations in low mass X-ray binaries”, Astronomy Reports, vol. 59, pp. 441-446, June 2015.
- K. Boshkayev, J. A. Rueda, R. Ruffini, and I. Siutsou, “General Relativistic and Newtonian White Dwarfs”, Proc. Thirteenth Marcel Grossmann Meeting, pp. 2468-2474, Jan. 2015.
- K. Boshkayev, J. A. Rueda, and R. Ruffini, “SGRs and AXPs as Massive Fast Rotating Highly Magnetized White Dwarfs: the case of SGR 0418+5729”, Prof. Thirteenth Marcel Grossmann Meeting, pp. 2295-2300, Jan. 2015.
- K. Boshkayev, D. Bini, J. Rueda, A. Gericco, M. Muccino, and I. Siutsou, “What can we extract from quasiperiodic oscillations?”, Gravitation and Cosmology, vol. 20, pp. 233-239, Oct. 2014.
- K. Boshkayev, J. A. Rueda, R. Ruffini, and I. Siutsou, “General relativistic white dwarfs and their astrophysical implications”, Journal of Korean Physical Society, vol. 65, pp. 855-860, Sept. 2014.
- R. Belvedere, K. Boshkayev, J. A. Rueda, and R. Ruffini, “Uniformly rotating neutron stars in the global and local charge neutrality cases”, Nuclear Physics A, vol. 921, pp. 33-59, Jan. 2014.
- J. A. Rueda, K. Boshkayev, L. Izzo, R. Ruffini, P. Loren-Aguilar, B. Kulebi, G. Aznar-Siguán, and E. Garcia-Berro, “A White Dwarf Merger as Progenitor of the Anomalous X-Ray Pulsar 4U 0142+61?”, ApJL, vol. 772, p. L24, Aug. 2013.
- K. Boshkayev, L. Izzo, J. A. Rueda, and R. Ruffini, “SGR 0418+5729, Swift J1822.3-1606, and 1E 2259+586 as massive, fast-rotating, highly magnetized white dwarfs”, A&A, vol. 555, p. A151, July 2013.
- K. Boshkayev, J. Rueda, and R. Ruffini, “On the Maximum Mass and Minimum Rotation Period of Relativistic Uniformly Rotating White Dwarfs”, International Journal of Modern Physics Conference Series, vol. 23, pp. 193-197, Jan. 2013.
- K. Boshkayev, J. A. Rueda, R. Ruffini, and I. Siutsou, “On General Relativistic Uniformly Rotating White Dwarfs”, ApJ, vol. 762, p. 117, Jan. 2013.
- K. Boshkayev, J. Rueda, and R. Ruffini, “On the Maximum Mass of General Relativistic Uniformly Rotating White Dwarfs”, International Journal of Modern Physics E, vol. 20, pp. 136-140, 2011.

II d Other Teaching Duties

In addition to the supervision of PhD theses, I teach in the IRAP PhD Program and in the Doctoral Schools organized within it. The topics of teaching are the ones in section I.

II e International Scientific Collaborations

I have active scientific collaborations with the following professors/researches:

- In Argentina: Carlos R. Argüelles at UNLP (La Plata).

- In Brazil: Ulisses Barres de Almeida and Sergio B. Duarte at CBPF (Rio de Janeiro); R. Negreiros at UFF (Niterói); Débora P. Menezes at UFSC (Florianópolis); S. O. Kepler and C. A. Z. Vasconcellos at UFRGS (Porto Alegre); R. Marinho Jr and M. Malheiro at ITA (São José dos Campos); Marcelo Guzzo and Fernando Torres at Unicamp (Campinas); Luis J. Rangel-Lemos and Sheyse M. de Carvalho at UFT (Palma); Rafael Rodrigues de Lima at UDESC (Florianópolis); Jonas P. Pereira at UFABC (Santo André); Jaziel G. Coelho at INPE (São José dos Campos).
- In Colombia: Luis Nuñez, Guillermo González and Fabio Lora Clavijo at UIS (Bucaramanga); Leonardo A. Pachón and Antonio Enea Romano at UdeA (Medellín); César A. Valenzuela at Univalle (Cali).
- In England: Nikolaos Mavromatos at King College London (London); Pablo Lorén-Aguilar at Exeter University (Exeter).
- In Germany: Volker Perlick at University of Bremen (Bremen).
- In Kazakhstan: Kuantay Boshkayev at Al-Farabi Kazakh National University (Almaty).
- In Mexico: Hernando Quevedo at UNAM (México D. F.).
- In Spain: Enrique García-Berro at UPC (Barcelona); Luis Herrera Cometta at University of Salamanca (Salamanca).
- In USA: Chris L. Fryer at LANL (New Mexico); G. Mathews at UND (South Bend).

II e. Work With Postdocs

-Riccardo Belvedere (CAPES-ICRANet Program Fellow at ICRANet - Rio de Janeiro and Universidade Federal Fluminense). Scientific collaboration in the topics 1 and 3.

Scientific Production:

- R. Belvedere, J. A. Rueda, and R. Ruffini, “On the Magnetic Field of Pulsars with Realistic Neutron Star Configurations”, *ApJ*, vol. 799, p. 23, Jan. 2015.
- R. Belvedere, K. Boshkayev, J. A. Rueda, and R. Ruffini, “Uniformly rotating neutron stars in the global and local charge neutrality cases”, *Nuclear Physics A*, vol. 921, pp. 33-59, Jan. 2014.

- Rafael Camargo Rodrigues de Lima (CAPES-ICRANet Program Fellow at ICRANet - Pescara). Scientific collaboration in the topics 1 and 3.

Scientific Production:

- D. L. Cáceres, S. M. de Carvalho, J. G. Coelho, R. C. R. de Lima, J. A. Rueda, “Thermal X-ray emission from massive, fast rotating, highly magnetized white dwarfs”, *MNRAS* 465, 4434 (2017).
- Jaziel G. Coelho, D. L. Cáceres, R. C. R. de Lima, M. Malheiro, J. A. Rueda, R. Ruffini “The rotation-powered nature of some SGRs and AXPs”, *A&A* 599, A87 (2017).

- Sheyse Martins de Carvalho (CAPES-ICRANet Program Fellow at ICRANet – Rio de Janeiro and Universidade Federal Fluminense). Scientific collaboration in the topics 1-3.

Scientific Production:

- D. L. Cáceres, S. M. de Carvalho, J. G. Coelho, R. C. R. de Lima, J. A. Rueda, “Thermal X-ray emission from massive, fast rotating, highly magnetized white dwarfs”, submitted.

- S. M. de Carvalho, R. Negreiros, J. A. Rueda, and R. Ruffini, “Thermal evolution of neutron stars with global and local neutrality”, Phys. Rev. C, vol. 90, p. 055804, Nov. 2014.

- **Jaziel Goulart Coelho (CAPES-ICRANet Program Fellow at ICRANet and Sapienza University of Rome). Scientific collaboration in the topics 1-3.**

Scientific Production:

- D. L. Caceres, S. M. de Carvalho, J. G. Coelho, R. C. R. de Lima, J. A. Rueda, “Thermal X-ray emission from massive, fast rotating, highly magnetized white dwarfs”, submitted.
- Jaziel G. Coelho, D. L. Caceres, R. C. R. de Lima, M. Malheiro, J. A. Rueda, R. Ruffini “On the nature of some SGRs and AXPs as rotation-powered neutron stars”, A&A, accepted.
- J. G. Coelho, R. M. Marinho, M. Malheiro, R. Negreiros, D. L. Caceres, J. A. Rueda, and R. Ruffini, “Dynamical Instability of White Dwarfs and Breaking of Spherical Symmetry Under the Presence of Extreme Magnetic Fields”, ApJ, vol. 794, p. 86, Oct. 2014.
- J. P. Pereira, J. G. Coelho, and J. A. Rueda, “Stability of thin-shell interfaces inside compact stars”, Phys. Rev. D, vol. 90, p. 123011, Dec. 2014.

III. Service activities [*activities carried out in collaboration with ICRANet (e.g. teaching activities, conferences etc...) and outside ICRANet (teaching activities in your university etc...)*]

III a. Within ICRANet

- Coordinator of the CAPES-ICRANet Program
- Member of the IRAP- PhD Faculty

III b. Outside ICRANet

Journal Referee:

- European Journal of Physics
- Astrophysics and Space Science Researches in Astronomy and Astrophysics
- Canadian Journal of Physics
- Advances and Space Research
- Mathematical Reviews of the American Mathematical Society
- General Relativity and Gravitation

Scientific Advisor and/or Project Evaluation

- National Center of Science and Technology Evaluation, Ministry of Education and Science, Kazakhstan
- Agencia Nacional de Promoción Científica y Tecnológica and Fondo para la Investigación Científica y Tecnológica del Ministerio de Ciencia, Tecnología e Innovación Productiva, Argentina

Scientific Visits to other Institutions

- Universidad Industrial de Santander, 23-27 October 2017, Bucaramanga (Colombia).

2017 List of Publication

1. L. Becerra, M. Guzzo, F. Rossi-Torres, J. A. Rueda, R. Ruffini, J. D. Uribe, “Neutrino Oscillations within the Induced Gravitational Collapse Paradigm of Long Gamma-Ray Bursts”, *The Astrophysical Journal* 852, 120 (2018).
2. Gómez, L. Gabriel; Rueda, J. A., “Dark matter dynamical friction versus gravitational wave emission in the evolution of compact-star binaries”, *Physical Review D* 96, 063001, 2017.
3. Cipolletta, Federico; Cherubini, Christian; Filippi, Simonetta; Rueda, Jorge A.; Ruffini, Remo, “Equilibrium Configurations of Classical Polytropic Stars with a Multi-Parametric Differential Rotation Law: A Numerical Analysis”, *Communications in Computational Physics* 22, 863, 2017.
4. Cipolletta, F.; Cherubini, C.; Filippi, S.; Rueda, J. A.; Ruffini, R., “Last stable orbit around rapidly rotating neutron stars”, *Physical Review D* 96, 024046, 2017.
5. Coelho, Jaziel G.; Cáceres, D. L.; de Lima, R. C. R.; Malheiro, M.; Rueda, J. A.; Ruffini, R., “The rotation-powered nature of some soft gamma-ray repeaters and anomalous X-ray pulsars”, *A&A* 599, A87, 2017.
6. Cáceres, D. L.; de Carvalho, S. M.; Coelho, J. G.; de Lima, R. C. R.; Rueda, Jorge A., “Thermal X-ray emission from massive, fast rotating, highly magnetized white dwarfs”, *MNRAS* 465, 4434, 2017.
7. Rueda, Jorge A.; Aimuratov, Y.; de Almeida, U. Barres; Becerra, L.; Bianco, C. L.; Cherubini, C.; Filippi, S.; Karlica, M.; Kovacevic, M.; Fuksman, J. D. Melon; Moradi, R.; Muccino, M.; Penacchioni, A. V.; Pisani, G. B.; Primorac, D.; Ruffini, R.; Sahakyan, N.; Shakeri, S.; Wang, Y., “The binary systems associated with short and long gamma-ray bursts and their detectability”, *IJMPD* 26, 1730016, 2017.

Ruffini Remo

Position: Director ICRANet



Curriculum Vitae:

- Doctorate in Physics, University of Rome, 1966.
- Postdoctoral fellow Mainz Academy of Sciences. Hamburg, Fed. Republic, Germany, 1967.
- Postdoctoral fellow Palmer Physics Lab. Princeton University, N.J., 1967-68.
- Member Institute for Advanced Study, Princeton, N.J., 1968-70.
- Instructor, Princeton Univ., 1970-71.
- Assistant Professor, Princeton University, 1971-74.
- Member Institute for Advanced Study, Princeton, N.J. 1974-76 .
- Visiting professor Kyoto University (Japan), 1975.
- Visiting professor University of Western Australia, Nedlands (Australia), 1975.
- Professor University of Catania, Italy, 1976-78.
- Professor, Chair of Theoretical Physics, University of Rome “la Sapienza”, 1978-2012
- Member Council of Center. International Physics, Bogotá, Colombia, 1984-
- President International Center Relativistic Astrophysics (ICRA), 1985-
- Director of ICRANet, 2005-present
- Member of Task Force Scientific Use of Space Station NASA, Washington, 1986-88.
- Chairman International Organizing Committee of Marcel Grossmann Meetings, 1984-
- Member International Forum on the Scientific Use of Space Station, Washington, 1986-90.
- Member of Consiglio Ricerche Astronomiche, Rome, 1987-91.
- Co-Chairman Italian-Korean Meetings on Relativistic Astrophysics, Rome and Seoul, 1987-
- Chairman William Fairbanks Meetings, 1990-
- President of the Scientific Committee of the Italian Space Agency, Rome, 1989-93.
- Member of the Board of ENEA, 2004-
- Co-Director Advanced Series in Astrophysics and Cosmology-World Scientific, Singapore, 1986
- Editor Internat. Jour. Modern Phys. D World Scientific Singapore, 1992-

- Editor of the series “The Marcel Grossmann meetings on relativistic Field Theories”, 1985-
- Co- Editor of the Series” Italo-Korean meetings on Relativistic Astrophysics”.
- Member Sigma Xi.
- Member Italian Physical Society.
- Founding Member of European Physical Society.
- Member of Euroscience
- Fellow recipient:
 - Cressy Morrison award of the New York Academy of Sciences , 1972.
 - Fellow of the American Physical Society 1974-
 - Alfred P. Sloan Foundation fellow, 1974-76.
 - Space Scientist of the Year Award, 1992.
 - Honorary Professor of University of Kirghizia 1998-

Main Scientific Publications:

Coauthor, among others, of the following books:

1. (with J. Bardeen, B. Carter, H. Gursky, S. Hawking, I. Novikov and K. Thorne) “Black holes”, Ed. B. and C. de Witt, Gordon and Breach, New York, 1973,
2. (with M. Rees and J.A. Wheeler) “Black Holes, Gravitational Waves and Cosmology”, Gordon and Breach N.Y. 1974, also translated in Russian as “Cernie Dirigratazionnie Volni I Kosmologia”, Mir, Moscow 1974,
3. (with H.Gursky) “Neutron Stars, Black Holes and Binaries Sources”, D. Reidel, Dordrecht, 1975,
4. (with R. Giacconi et al.) “Physics and Astrophysics of Neutron Stars Black Holes”, North Holland Pub. Co. Amsterdam 1978
5. (with Humitaka Sato) “Black Holes”, in japanese, Chuo Koron-Sha, Tokyo 1976,
6. (with Fang Li Zhi) “Basic Concepts in Relativistic Astrophysics”, in chinese, Science Press, Beijing 1981, also translated into english,, World Scientific, Singapore 1983,
7. (with Francesco Melchiorri) “Gamow Cosmology”, North Holland Pub. Co., Amsterdam,1986,
8. (with H. Ohanian) “Gravitation and Spacetime” W.W. Norton and Co., New York 1976,
9. (with H. Ohanian) “Gravitazione e Spazio-Tempo” Zanichelli, Bologna 1997
10. (with H. Ohanian) “Gravitation and Spacetime” W.W. Norton and Shin Won Agency Co., Seoul 2001

2016 List of Publication

1. Ruffini, R., Muccino, M., Aimuratov, Y., Bianco, C. L., Cherubini, C., Enderli, M., Kovacevic, M., Moradi, R., Penacchioni, A. V., Pisani, G. B., Rueda, J. A., & Wang, Y.; “GRB 090510: A Genuine Short GRB from a Binary Neutron Star Coalescing into a Kerr-Newman Black Hole”; *The Astrophysical Journal*, 831 (2016) 178
2. Pisani, G. B., Ruffini, R., Aimuratov, Y., Bianco, C. L., Kovacevic, M., Moradi, R., Muccino, M., Penacchioni, A. V., Rueda, J. A., Shakeri, S., & Wang, Y.; “On the universal late X-ray emission of binary-driven hypernovae and its possible collimation”; *ArXiv e-prints*, (2016) arXiv:1610.05619
3. Gomez, L. Gabriel, Arguelles, C. R., Perlick, Volker, Rueda, J. A., & Ruffini, R.; “Strong lensing by fermionic dark matter in galaxies”; *ArXiv e-prints*, (2016) arXiv:1610.03442
4. Batebi, S., Mohammadi, R., Ruffini, R., Tizchang, S., & Xue, S.-S.; “Generation of circular polarization of gamma ray bursts”; *Physical Review D*, 94 (2016) 065033
5. Arguelles, C. R., Rueda, J. A., & Ruffini, R.; “Theoretical evidence of 50 keV fermionic dark matter from galactic observables”; *ArXiv e-prints*, (2016) arXiv:1606.07040
6. Becerra, L., Bianco, C. L., Fryer, C. L., Rueda, J. A., & Ruffini, R.; “On the induced gravitational collapse scenario of gamma-ray bursts associated with supernovae”; *ArXiv e-prints*, (2016) arXiv:1606.02523
7. Rodriguez, J. F., Rueda, J. A., & Ruffini, R.; “What can we really infer from GW 150914? (II)”; *ArXiv e-prints*, (2016) arXiv:1605.07609
8. Rodriguez, J. F., Rueda, J. A., & Ruffini, R.; “What can we really infer from GW 150914?”; *ArXiv e-prints*, (2016) arXiv:1605.04767
9. Arguelles, C. R., Mavromatos, N. E., Rueda, J. A., & Ruffini, R.; “The role of self-interacting right-handed neutrinos in galactic structure”; *Journal of Cosmology and Astro-Particle Physics*, 4 (2016) 038
10. Boshkayev, Kuantay, Rueda, Jorge A., Ruffini, Remo, & Zhami, Bakytzhan; “Induced Compression of White Dwarfs by Angular Momentum Loss”; *ArXiv e-prints*, (2016) arXiv:1604.02393
11. Boshkayev, Kuantay, Rueda, Jorge A., Ruffini, Remo, Zhami, Bakytzhan, Kalymova, Zhanerke, & Balgimbekov, Galymdin; “Mass-radius relations of white dwarfs at finite temperatures”; *ArXiv e-prints*, (2016) arXiv:1604.02391
12. Ruffini, R., Rodriguez, J., Muccino, M., Rueda, J. A., Aimuratov, Y., Barres de Almeida, U., Becerra, L., Bianco, C. L., Cherubini, C., Filippi, S., Gizzi, D., Kovacevic, M., Moradi, R., Oliveira, F. G., Pisani, G. B., & Wang, Y.; “On the rate and on the gravitational wave emission of short and long GRBs”; *ArXiv e-prints*, (2016) arXiv:1602.03545

13. Ruffini, R., Rueda, J. A., Muccino, M., Aimuratov, Y., Becerra, L. M., Bianco, C. L., Kovacevic, M., Moradi, R., Oliveira, F. G., Pisani, G. B., & Wang, Y.; “On the classification of GRBs and their occurrence rates”; ArXiv e-prints, (2016) arXiv:1602.02732
14. Ruffini, R., Vereshchagin, G. V., & Xue, S.-S.; “Cosmic absorption of ultra high energy particles”; Astrophysics and Space Science, 361 (2016) 82
15. Ruffini, R., Aimuratov, Y., Becerra, L., Bianco, C. L., Kovacevic, M., Moradi, R., Muccino, M., Penacchioni, A. V., Pisani, G. B., Primorac, D., Rueda, J., & Wang, Y.; “GRB 160521B: Theoretical estimate of the redshift and urgent need for further x-ray observations”; GRB Coordinates Network, 19456 (2016) 1

PERSONAL INFORMATION

Narek Sahakyan



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✉ [narek\(at\)icra.it](mailto:narek(at)icra.it) [narsahakyan\(at\)gmail.com](mailto:narsahakyan(at)gmail.com)

Sex Male | Date of birth 16/09/1986 | Nationality Armenian

WORK EXPERIENCE

2016- present

Adjunct Professor of ICRANet

International Center for Relativistic Astrophysics Network

2014 – present

Researcher

ICRANet Armenia, National Academy of Sciences, Yerevan, Armenia

2013 – 2014

PostDoc

ICRANet, Pescara-Rome, Italy

2006 – 2009

Senior laboratory assistant

Yerevan Physics Institute, Yerevan, Armenia

EDUCATION AND DEGREES

2009 - 2012

PhD in Relativistic Astrophysics

Department of Physics, University of Rome "Sapienza", ICRANet, Italy

2009 - 2012

PhD in Theoretical Physics

Yerevan State University, Armenia

2007 - 2009

Master in Physics

Yerevan State University, Faculty of Physics, Armenia

2003 - 2007

Bachelor in Physics, with honours

Yerevan State University, Faculty of Physics, Armenia

PERSONAL SKILLS

Mother tongue(s)

Armenian

Other language(s)

	UNDERSTANDING		SPEAKING		WRITING
	Listening	Reading	Spoken interaction	Spoken production	
English	C2	C2	C2	C2	C2
Russian	C2	C2	C1	C1	C1

Communication skills

Good communication skills

Job-related skills

Proven research skills in high energy astrophysics, astroparticle physics, data analysis of astrophysical data, numerical simulations

Organisational / managerial skills	Team player Good organizational skills; Ruffini, R. and Sahakyan, N. organization of “1-st ICRANet Scientific Meeting in Armenia: Black Holes and the largest energy sources in the Universe”, 30 June - 4 July 2014 – Yerevan, (http://www.icranet.org/index.php?option=com_content&task=view&id=752 , more than 80 participants from Italy, France, Germany, Brazil, China, Korea, Iran and Armenia).
Computer skills	Typesetting: Latex, Word, PowerPoint Data analysis: Mathematica, Matlab, HeaSoft package, Excel Programming language: Python, C, C++, Fortran Scientific toolkit: Geant4

ADDITIONAL INFORMATION

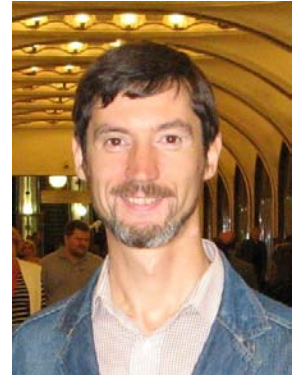
Recent Publications

- Sahakyan, N.**
“Galactic sources of high energy neutrinos: Expectation from gamma-ray data”, EPJ Web of Conferences, arXiv:1512.02333, 2015.
 - Sahakyan, N.; Zargaryan, D.; Baghmany, V.**
“On the gamma-ray emission from 3C 120”, A&A, 574, id.A88, 2015.
 - Sahakyan, N.; Yang, R.; Rieger, F.; Aharonian, F.; de Ona-Wilhelmi, E.**
“High Energy Gamma Rays from Centaurus A”, World Scientific Publishing 9789814623995, pp. 1028-1030, 2015.
 - Sahakyan, N.; Rieger, F.; Aharonian, F.; Yang, R.; de Ona-Wilhelmi, E.**
“On the Gamma-Ray Emission from the Core and Radio Lobes of the Radio Galaxy Centaurus A”, IJMP: Conference Series, 28, id. 1460182, 2014.
 - Sahakyan, N.; Piano, G.; Tavani, M.**
“Hadronic Gamma-Ray and Neutrino Emission from Cygnus X-3”, ApJ, 780, 1, 29, 2014.
 - Sahakyan, N.; Yang, R.; Aharonian, F. A.; Rieger, F. M.**
“Evidence for a Second Component in the High-energy Core Emission from Centaurus A?”, ApJL, 770, 1, L6, 2013.
 - Sahakyan, N.**
“Fermi LAT Observation of Centaurus A Radio Galaxy”, IJMP: Conference Series, 23, pp. 27-33, 2013.
 - Yang, R.-Z.; Sahakyan, N.; de Ona Wilhelmi, E.; Aharonian, F.; Rieger, F.**
“Deep observation of the giant radio lobes of Centaurus A with the Fermi Large Area Telescope”, A & A, 542, id.A19, 2012.
 - Sahakyan, N.**
“High energy γ -radiation from the core of radio galaxy Centaurus A”, Astrophysics, 55, 1, 2012.
 - Sahakyan, N.**
“On the Origin of High Energy Gamma-Rays from Giant Radio Lobes Centarus A”, IJMP: Conference Series, 12, 2012.
 - Vissani, F.; Aharonian, F.; Sahakyan, N.**
“On the detectability of high-energy galactic neutrino sources”, Astroparticle Physics, 34, 10, 2011.
- Participated in the international conferences MG13, MG14, RICAP14, TEXAS 2010, Gamma 2012, etc.

Conferences

Vereshchagin Gregory

Position: researcher
Period covered: 2017



I Scientific Work

The work focused on the following aspects:

- Photon-photon scattering and absorption of high energy photons in the Universe

Photon-photon scattering of gamma-rays on the cosmic microwave background has been studied using the low energy approximation of the total cross section by Zdziarski and Svensson. Here, the cosmic horizon due to photon-photon scattering is accurately determined using the exact cross section and we find that photon-photon scattering dominates over the pair production at energies smaller than 1.68 GeV and at redshifts larger than 180.

- Bose enhancement and Pauli blocking in the pair plasma (with I.A. Siutsou, A.G. Aksenov and N.O. Prokopenya)

Interactions in homogeneous electron-positron-photon plasma are studied numerically using the relativistic kinetic Boltzmann equation, with collision integrals given by QED. Efficient method for computations of reaction rates of two-particle interactions is developed. The results are compared with analytical approximations, showing excellent agreement.

- Thermal emission in the early afterglow of GRBs from their interaction with supernova ejecta (with R. Ruffini and Yu Wang)

The interaction between the GRB ejecta and a baryonic shell is considered in the context of the binary driven hypernova model of Gamma-Ray Bursts. The kinematic and observational properties of the shell after the interaction are derived. In particular, the temperature and the duration of the thermal emission are obtained. The model is then applied to GRB 090618 and the observed characteristics of the thermal component are reproduced.

- Inflationary measure in loop quantum cosmology (with S. Bedic)

Recently a contradiction between Liouville's theorem and attractor-like behavior in inflationary models has been analyzed by Remmen and Carroll. Motivated by their analysis we perform the study of inflationary measure in loop quantum cosmology. In addition, we analyze the stability of bouncing solutions using Lyapunov exponents.

II Conferences and educational activities

II a Conferences and Other External Scientific Work

- First ICRANet-Minsk workshop on high energy astrophysics, National Academy of Sciences of Belarus, Minsk, Belarus, April 26-28, 2017. Talk: “Cosmic horizon for GeV sources and photon-photon scattering”.
- XIII International Conference on Gravitation, Astrophysics and Cosmology and 15th Italian-Korean Symposium on Relativistic Astrophysics: A joint meeting, Ewha Womans University, Seoul, Korea, July 3 - 7, 2017. Talk “Cosmic horizon for GeV sources and photon-photon scattering”.

II b Work With Students

- David Melon Fursman (IRAP PhD): on generation of multiple shocks in GRB outflows
- Nikolai Prokopenya (NASB): reaction rates in relativistic plasma
- Susana Bedic (IRAP PhD): inflationary measure in loop quantum cosmology

II c Diploma thesis supervision

II d Other Teaching Duties

II e. Work With Postdocs

- Ivan Siutsou: on Bose enhancement and Pauli blocking in the pair plasma
- Wang Yu: on thermal emission in early afterglow from the GRB-SNR interaction

III. Service activities [*activities carried out in collaboration with ICRANet (e.g. teaching activities, conferences etc...) and outside ICRANet (teaching activities in your university etc...)*]

III a. Within ICRANet

- Member of the IRAP PhD Faculty
- coordination of cooperation with the Belarusian State University
- coordination of cooperation with the National Academy of Sciences of Belarus
- coordination of activities in ICRANet-Minsk center
- organizational work for Fifteenth Marcel Grossmann Meeting
- organizational work for Third Zeldovich Meeting
- organizational work for the 15th Italian-Korean symposium on relativistic astrophysics
- supervision of the ICRANet newsletter
- supervision of ICRANet press releases

III b. Outside ICRANet

- Co-PI of the scientific program “Relativistic astrophysical objects and phenomena” within the Belorussian state program “Convergence-2020”, subprogram “Microworld and Universe”.

IV. Other

This year the monograph "Relativistic Kinetic Theory With Applications in Astrophysics and Cosmology" written in co-authorship with Alexey Aksenov from ICAD, RAS, has been published by Cambridge University Press. It represents nearly 10 years of research work.

2017 List of Publication

1. G.V. Vereshchagin and A. G. Aksenov, "Relativistic Kinetic Theory With Applications in Astrophysics and Cosmology", Cambridge University Press, 2017.
2. R. Ruffini G. V. Vereshchagin Yu Wang, “Thermal emission in the early afterglow of GRBs from their interaction with supernova ejecta”, A&A 600 (2017) A131.
3. G.V. Vereshchagin, “Cosmic horizon for GeV sources and photon-photon scattering”, accepted for publication in Astrophysics and Space Science, 2018.
4. V.A. Belinski and G.V. Vereshchagin, “On the cosmological gravitational waves and cosmological distances”, submitted to Phys. Lett. B, 2017.
5. G.V. Vereshchagin and S. Bedic, “Inflationary measure in loop quantum cosmology”, in preparation.
6. N. O. Prokopenya, I. A. Siutsou, G. V. Vereshchagin, “Numerical scheme for treatment of Uehling-Uhlenbeck kinetic equation for two-particle interactions in electron-positron-photon plasma”, submitted to Journal of Computational Physics, 2017.

Xue She-Sheng

Position: ICRANet Faculty

Period covered: 2016 -- 2017



I Scientific Work

Strong and pulsating electromagnetic field in gravitational collapse and heavy atoms, as well as its relevance to Gamma-Ray Bursts (GRBs) and heavy atom physics.

Strong electromagnetic field in compact stars and heavy atoms and its relevance to their structure and properties.

Pair production rates and radiation in strong and time-varying electromagnetic fields, and its applications in physics and astrophysics.

Pair production and interactions of fields and matter in the cosmological evolution within the framework of Einstein-Maxwell theory.

Four-fermion interactions of Einstein-Cartan theory and its resulted particle spectra for matter and dark matter.

The opacity of high energy cosmic particles in terms of their energy and travelling distance.

See the following list of publications.

II Conferences and educational activities

II a Conferences and Other External Scientific Work

Participating the organizations of ICRANet meetings in Korea and China: the 15th Italian-Korean meeting (July, 2017, Seoul, Korea) and 5th Galileo –Xu Guangqi meeting (GX5, June, 2017).

Participating the organization of MG15 Rome, July 2018.

Participating the preparation of ICRANet agreements with Institutions of China (2017).

Participating the preparation of ICRANet outreach activities: ICRANet exhibitions in Pescara and Rome, la Notte Europea dei Ricercatori 2017 and Besso foundation.

II b Work With Students

Wang Yu and Rahim Moradi (IRAP Ph.D. students), Li Liang and Luis Gabriel Gómez Díaz, (Erasmus Mundus Ph.D. students), David Melon Fuksman, Yu Ling Chang and Yen-Chen Chen, Iranian Ph.D.

students, Soroush Shakeri, Maryam Amiri, B. Eslam Panah and Rashid Riahi, as well as Takahiro Hayashinaka, Cheng-Jun Xia (supported by their nation).

II c Diploma thesis supervision (2012-2017)

Yuanbin Wu, Handrik Ludwig, Eckhard Strobel, and Clement Stahl (all are Erasmus Mundus Ph.D. students), their main publications: 10 in Phys. Rev. , and 5 in Nucl. Phys., Phys. Lett.

II d Other Teaching Duties (2012-2017)

Teaching courses in Nice and Les Houches schools for IRAP Ph.D. Erasmus Mundus students.

II e. Work With Professors and Postdocs inside and outside ICRANet (2012-2017)

R. Ruffini, H. Kleinert, G. Vereshchagin, J. Rueda, C. Bianco, W.B. Han, I. Siutsou, C. Argulles, C. Gruber, R. Mohammadi, D. Bégué, E. Bavarsad and Sang Pyo Kim.

III. Service activities [*activities carried out in collaboration with ICRANet (e.g. teaching activities, conferences etc...) and outside ICRANet (teaching activities in your university etc...)*]

III a. Within ICRANet

Participating organization of ICRANet Seminars and ICRANet outreach activity.
Participating preparation of ICRANet Newsletter. Working with ICRANet administration.

III b. Outside ICRANet

Visiting Chinese Institutions IHEP and ITP that are in cooperation with ICRANet .

IV. Other

List of Publications (2016 - 2017)

- R. Ruffini, G. Vereshchagin and S.-S. Xue, "Cosmic absorption of ultra high energy particles", Astrophysics and Space Science, Volume 361:82, 2016.
- S. Batebi, R. Mohammadi, R. Ruffini, S. Tizchang, and S.-S. Xue, `` Generation of circular polarization of gamma ray bursts", Phys. Rev. D 94, 065033 (2016).
- C. Stahl, E. Strobel, and S.-S. Xue, ``Fermionic current and Schwinger effect in de Sitter spacetime", Phys. Rev. D 93, 025004 (2016).
- R. Mohammadi, J. Khodagholizadeh, M. Sadegh, and S.-S. Xue, ``B-mode polarization of the CMB and the cosmic neutrino background ", Phys. Rev. D 93, 125029 (2016).
- S.-S. Xue, `` Fermion masses from top quark to electron neutrino", Phys. Rev. D 93, 073001 (2016) and JHEP 11, 027 (2016).
- C. Stahl and S.-S. Xue, `` Schwinger effect and backreaction in de Sitter spacetime", Phys. Lett B 760, 288-292 (2016).

- E. Bavarsad, C. Stahl, S.-S. Xue, ``Scalar current of created pairs by Schwinger mechanism in de Sitter spacetime'', Phys. Rev. D 94, 104011 (2016).
- S.-S. Xue, ``An effective strong-coupling theory in UV-domain'' JHEP 05, 146 (2017).
- S. Shakeri, S. Z. Kalantari, and S.-S. Xue, ``Polarization of a probe laser beam due to nonlinear QED effects'', Physical Review A 95, 012108 (2017).
- S. Shakeri, M. Haghighat, S.-S. Xue, ``Nonlinear QED effects in X-ray emission of pulsars'', JCAP 10, 014 (2017).
- R. Moradi, C. Stahl, J. Firouzjaee, S.-S. Xue, ``Charged cosmological black hole'', Phys. Rev. D 96, 104007, 2017.
- C. Cherubini, S. Filippi, A. Loppini, R. Ruffini, R. Moradi, Y. Wang, and S.-S. Xue, ``On Perfect Relativistic magnetohydrodynamics around black holes in horizon penetrating coordinates'' to appear in Phys. Rev. D (2018)
- E. Bavarsad, S. P. Kim, C. Stahl, S.-S. Xue, ``Effect of a magnetic field on Schwinger mechanism in de Sitter spacetime'', to appear in Phys. Rev. D (2018).
- R. Ruffini, et al., "Early X-Ray Flares in GRBs", to appear in ApJ (2018) .
- C. Stahl, S. Eckhard and S.-S. Xue, ``Pair creation in the early universe'', the proceedings of Fourteenth Marcel Grossmann Meeting - MG14, World scientific. 2017.
- T. Seddigheh, B. Saghar, M. Rohollah, R. Ruffini, G. Vereshchagin, S.-S. Xue, ``On the interaction of high energy photons with the cosmic microwave background'', the proceedings of Fourteenth Marcel Grossmann Meeting - MG14, World scientific, 2017.
- B. Saghar, T. Seddigheh, M. Rohollah, R. Ruffini, S.-S. Xue, ``On the interaction of high energy photons with the cosmic microwave background'', the proceedings of Fourteenth Marcel Grossmann Meeting - MG14, World scientific, 2017

Adjunct Professors of the Faculty

Amati Lorenzo



Position: Adjunct Professor of the ICRANet Faculty and senior researcher at INAF (IASF Bologna).

Period covered: full 2016

Short CV

Lorenzo Amati was born in Modena, Italy, in 1966. He graduated in Astronomy at the University of Bologna in 1991 and received the PhD degree in astronomy from University "La Sapienza" of Rome in 1999. Since 1998, Lorenzo Amati is a research staff member at the Institute of Space Astrophysics and Cosmic Physics (IASF) in Bologna, which is part of the Italian National Institute for Astrophysics (INAF). He is also Adjunct Professor of the Faculty of the International Center for Relativistic Astrophysics Network (ICRANet) and member of the Faculty of the PhD course in Physics at the University of Ferrara. In 2011 Lorenzo Amati was elected member of the Board for Relativistic and Particle Astrophysics of the Italian National Institute for Astrophysics (INAF). Lorenzo Amati has also been Member of the Space Astrophysics Working Group of the Italian Space Agency (ASI) in 2007-2008, has been member of the BeppoSAX team from 1996 to 2002, is member of the Swift team since 2005, is member of the ATHENA collaboration since 2014, is member of the LOFT consortium and coordinator of the THESEUS consortium, is member of the International Astronomical Union (IAU), of SIGRAV and of ISGRG (International Society on General Relativity and Gravitation).

I Scientific Work

My field of research is high energy astrophysics, with particular emphasis on Gamma-Ray Bursts (GRB) studies. Under this respect, his research highlights include the discovery (in 2000) of a transient X-ray absorption edge in the first 13 s of GRB 990705, leading to the first estimate for a GRB redshift based on X-ray data, and the discovery of a strong correlation between the photon energy at which GRB spectra peaks and their radiated energy (known as "Amati relation"), which has relevant implication for the physics and possible cosmological use of these phenomena. Lorenzo Amati is also involved in the study (science case and instrument concept) of future missions for GRB studies (e.g., THESEUS) and dedicates a minor part of his research work to the study of X-ray binaries.

My scientific collaboration with ICRANet is focused on Gamma-Ray Burst (GRB) astrophysics, with particular emphasis on the testing of the fireshell model against X-ray and gamma-ray data of the prompt emission. In particular, in 2016 I contributed to finalizing several research works which were the subject of the PhD Thesis of IRAP-PhD students. For example, in collaboration with the University of Nice and ARTEMIS, we worked on the unusual behaviour of GRB 141221A, based on a unique collection of multi-wavelengths data. Also, in collaboration with University of Ferrara and University Federico II di Napoli, we concluded the investigation of spectral-energy correlations in GRBs

and the reliability of their use for cosmology. Finally, ICRANet was involved in the preparation of the proposal for ESA/M5 of THESEUS, a mission concept aiming at exploiting GRBs for the investigation of the Early Universe.

Besides my collaboration with ICRANet, my main scientific activity includes: spectral, timing and correlation properties of GRBs, investigation of the cosmological use of GRBs, X-ray spectral and timing properties of X-ray binaries, study of the scientific case and concept design of GRB detectors for future missions. Under this last respect, in particular, in 2015 I coordinated, as Lead Proposer, the preparation of the proposal THESEUS (Transient High-Energy Sky and Early Universe Explorer), submitted to ESA in response to the Call for next M5 mission. I also continued coordinating the GRB Science Working Group of the LOFT mission collaboration.

II Conferences and educational activities

II a Conferences and Other External Scientific Work

November 2016 IV Italian National Workshop on GRBs
Bergamo, Italy (invited session chair/rapporteur and oral presentation)

October 2016 Eighth Huntsville Gamma-Ray Burst Symposium
Huntsville AL, USA (invited oral presentation)

October 2016 11th Workshop on Science with the New generation of High Energy Gamma-ray Experiments (SCINEGHE16)
Pisa, Italy (oral presentation)

September 2016 SIGRAV 2016 XXII Conference - A Century of General Relativity
Cefalù, Italy (invited oral presentation)

September 2016 Astrophysical Probes of Fundamental Physics
Ferrara, Italy (lecturer)

July 2016 Signals from the Deep Past - Unveiling Early Cosmic Structures
Valletta, Malta (oral presentation)

July 2016 European Week of Astronomy and Space Science (EWASS 2016)
Athenis, Greece (oral presentation)

June 2016 SPIE Astronomical Telescopes + Instrumentation
Edinburgh, UK

II b Work With Students

In 2016 I mostly worked with Disha Sawant, student of the IRAP Erasmus Mundus PhD at University of Ferrara, concerning the investigation of the E_p - i – intensity correlations in GRBs and their use for cosmology

II c Diploma thesis supervision

I have been the supervisor of Disha Sawant, student of the IRAP Erasmus Mundus PhD at University of Ferrara, who successfully defended her Thesis on next February 29th. I am the supervisor of Chiara Giuri, student for the “Laurea Magistrale “ (master) diploma in Astrophysics and Cosmology at University of Bologna.

II d Other Teaching Duties

I am member of the faculty of the PhD course in Physics at University of Ferrara.

II e. Work With Postdocs

In 2016 I mostly worked with Dr. Luca Izzo, Dr. Marco Muccino and N. Pisani on the use of the correlations between prompt and afterglow GRB observables for cosmology and on the association of GRBs (long and short) with SNe.

III. Service activities

III a. Within ICRANet

III b. Outside ICRANet

I am member of the Faculty of the PhD in Physics and Geophysical Sciences at University of Ferrara. In September 2016 I have been Lecturer at the PhD school “Astrophysical Probes of Fundamental Physics” at University of Ferrara, Italy. Until Dec. 2015 I have been member of the Board for Relativistic and Particle Astrophysics of INAF (Macroarea 4). I acted as referee for some of the main Refereed Journals in the field of astrophysics (ApJ, MNRAS, A&A). I acted as a reviewer for the Italian ministry of Education and University (MIUR, SIR projects).

2016 List of Publication

M. Demianski, E. Piedipalumbo, D. Sawant, **L. Amati**, 2016, " Cosmology with gamma-ray bursts. II. Cosmography issues and cosmological scenarios for the accelerated Universe " , Astronomy & Astrophysics, in press

M. Demianski, E. Piedipalumbo, D. Sawant, **L. Amati**, 2016, " Cosmology with gamma-ray bursts. I. The Hubble diagram through the calibrated $E_{p,i}$ - Eiso correlation " , Astronomy & Astrophysics, in press

W., Yuan, **L. Amati**, J.K. Cannizzo, B. Cordier, N. Gehrels, G. Ghirlanda, D. Götz, N. Produit, Y. Qiu, J. Sun, N.R. Tanvir, J. Wei, C. Zhang, 2016, " Perspectives on Gamma-Ray Burst Physics and Cosmology with Next Generation Facilities " , Space Science Reviews, in press

L. Amati, D.S. Sawant, M. Della Valle, 2016, " GRB cosmology through the $E_{p,i}$ - intensity correlation " , Astronomical and Astrophysical Transactions, 29/2, 193

B. P. Abbott, R. Abbott, T. D. Abbott, M. R. Abernathy, F. Acernese, ..., **L. Amati**, et al., 2016, " Supplement: Localization and broadband follow-up of the gravitational-wave transient GW150914 " , The Astrophysical Journal Supplement, 225, 8

- B. P. Abbott, R. Abbott, T. D. Abbott, M. R. Abernathy, F. Acernese, ..., **L. Amati**, et al., 2016, " Localization and broadband follow-up of the gravitational-wave transient GW150914 " , The Astrophysical Journal Letters, 826, L13
- C. Guidorzi, S. Dichiara, **L. Amati**, 2016, " Individual power density spectra of Swift gamma-ray bursts " , Astronomy & Astrophysics, 589, A98
- S. Dichiara, C. Guidorzi, **L. Amati**, F. Frontera, R. Margutti, 2016, " A correlation between peak energy and Fourier power density spectrum slope in Gamma-Ray Bursts " , Astronomy & Astrophysics, 589, A97
- O. Bardho, B. Gendre, A. Rossi, **L. Amati**, J. Haislip, A. Klotz, E. Palazzi, D. Reichart, A.S. Trotter, M. Boer, 2016, " GRB 141221A: gone as the wind " , Monthly Notices of the Royal Astronomical Society, 459, 508
- F. Frontera, **L. Amati**, R. Farinelli, S. Dichiara, C. Guidorzi, R. Landi, L. Titarchuk, 2016, " Possible physical explanation of the intrinsic $E_{p,i}$ - "intensity" correlation commonly used to "standardize" GRBs " , International Journal of Modern Physics D, 25, 1630014
- E. Zaninoni, M.G. Bernardini, R. Margutti, **L. Amati**, 2016, " Update on the GRB universal scaling $E_{x,iso}$ - $E_{gamma,iso}$ - E_{pk} with ten years of Swift data. " , Monthly Notices of the Royal Astronomical Society, 455, 1375

Arnett William David



Present position: Adjunct Professor of the ICRANet Faculty
Regents Professor, Steward Observatory, University of Arizona, Tucson AZ, 85721

Education:
University of Kentucky, B.S., 1961;
Yale University, M.S. 1963, Ph.D. 1965, Physics

Previous position:
B. and E. Sunny Distinguished Service Professor, Astrophysics, Physics, and Enrico
Fermi Institute, University of Chicago, 1976-88

Professional Societies:
American Astronomical Society;
American Physical Society (Fellow)
International Astronomical Union
American Association for the Advancement of Science (Fellow).

Fellowships and Awards:
Alfred P. Sloan Research Fellowship, 1970
Yale Distinguished Graduate in Physical Sciences (with J. W. Truran), 1980
A. von Humboldt Prize (Senior Scientist), 1981
Member, National Academy of Sciences (1985-)
Member, American Academy of Arts and Sciences (1985-)
Member, Aspen Center for Physics (1997-2007)
Honorary Professor, Jilin University, Changchun, PRC (2005)
S. Chandrasekhar Lecture, Bose Center for Physics, Kolkata, (2007)
S. Chandrasekhar Professor, ICRANet, Rome, Pescara, Nice (2007-)
Bethe Prize, American Physical Society, 2009
Marcel Grossman Prize, International Center for Relativistic Astrophysics, 2012
Henry Norris Russell Lecturer, American Astronomical Society, 2012

Faculty Fellow, Texas A&M University Institute for Advanced Study, 2015-2016

Recent Professional Activities:

National Research Council Committee, "Potential Impact of High-End Computing", 2008
National Research Council Committee, "Future Directions for NSF Advanced Computing
Infrastructure to Support U. S. Science in 2017-2020"
Department of Energy Joint Needs Panel, "High Energy Density Laboratory Plasmas", 2009
National Ignition Campaign Review Committee, Lawrence Livermore National Laboratory,
2009-2013
Board, International Center for Relativistic Astrophysics Network, 2009-

Publications:

Book: Supernovae and Nucleosynthesis, Princeton University Press, 1996, 598 pages, 443
citations.
Articles: over 400 (over 200 in refereed journals), h-index = 64, over 13,000 citations, as of
2015

Belvedere Riccardo

Position: Post Doc

Period covered: April 2014 - Present



I Scientific Work

I am collaborating with Professor Remo Ruffini and Dr. Rueda to analyze the astrophysical consequences of our new model of neutron stars, in particular focusing on its effect on the Kerr quadrupole moment and the creation of a black hole. At the same time I am working with Professor Sergio Barbosa Duarte, from CBPF, to introduce more degrees of freedom in our neutron stars model, taking into account the Delta-Resonances in the Walecka and Zimanyi-Moszkowski models. With Professor Rodrigo Picanço Negreiros, from UFF (Universidade Federal Fluminense), I am applying the cooling to our model of neutron stars, being it, until now, developed in the $T=0$ limit.

II Conferences and educational activities

- The Second ICRANet César Lattes Meeting, Niteroi – Rio de Janeiro, Brazil, April, 13-18, 2015
- Fourteenth Marcel Grossmann Meeting – MG14 – University of Rome “La Sapienza” - Rome, July, 12-18, 2015.

2015 List of Publication

- R. Belvedere, J. A. Rueda, and R. Ruffini,
“On the Magnetic Field of Pulsars with Realistic Neutron Star Configurations”.
Astrophys. J., 799, 23, (2015)
- R. Belvedere, J. A. Rueda, and R. Ruffini,
“Suitability of Analytical Formulas for the Determination of the Neutron Star Keplerian Frequency and Moment of Inertia”.
Submitted to *Phys. Rev. C*

Bini Donato



Position: Reasercher (permanent position) at
Istituto per le Applicazioni del Calcolo,
"M. Picone," CNR
Via dei Taurini, 19 I-00185 Roma
Period covered: 1995 -today.

I Scientific Work

The main topic of my interest is General Relativity with special attention to several classical aspects, like the analysis and the interpretation of exact solutions of Einstein's field equations.

In particular, I'm interested in spacetime splitting techniques, measurement process and the role of the observer in General Relativity, particle dynamics in certain fixed gravitational backgrounds (either test particles with scalar structure: the mass, or particles with internal structure: spinning test particles and particles with multipolar structure, quadrupolar and beyond), gravitational perturbations, gravitational waves. Currently, the main topics of interest for my research activities involve the PN approximation of General Relativity, gravitational self-force, effective-one-body model, with applications to binary systems.

I'm an expert user of MAPLE™ tensor calculus package.

II Conferences and educational activities

Conferences and Other External Scientific Work

Since 1988 I have participated in all the international meetings of the Marcel Grossmann series as well as all the conferences of the ICRA- ICRANet series.

Diploma thesis supervision

I've been supervisor of the Diploma thesis of several students at the University of Rome "La Sapienza", since 1995:

G. Spoliti, A. Merloni, C. Germani, C. Cherubini, G. Miniutti, G. Cruciani, A. Geralico, A. Lunari, M. De Mattia, D. Gregoris.

Ph.D thesis supervision

Dr. V. Montaquila, Physics departments of the University of Naples "Federico II.," year 2011.

Dr. M. Haney, IRAP Ph.D, University of Rome "Sapienza," year 2013.

Gabriel G. Carvalho (CAPES, Brazil and ICRANet)

Teaching experiences

I'm Contract Professor of Physics since 2004 at the faculty of Medicine of the University Campus Biomedico, in Rome. From 2007-2009 I have also been Contract Professor of Physics at the Nursery School of the same university.

Work With Postdocs

A Geralico (University of Rome "La Sapienza" and ICRANet)

III Service activities

Scientific collaboration with:

Prof. R. Ruffini (University of Rome, Italy and ICRANet);

Prof. R.T. Jantzen (Villanova University, USA and ICRANet);

Outside ICRANet

Scientific collaboration with:

Prof. T. Damour (IHES, Paris, France).

Prof. F. de Felice (University of Padova, Italy);

Dr. A. Ortolan (INFN Legnaro, Padova, Italy);

Other

I'm currently doing referee activity for a large number of international journals in the field of General Relativity and I'm a reviewer for Mathreview.

For the years 2002-2004 I have been the leader of a collaboration project between the Italian Research Council (CNR) and the analogous institution in Venezuela. Title of the project: *Construction of 3d numerical models for the study of magnetohydrodynamics in gravitational physics and astrophysics*.

For the years 2007-2008 I have been the leader of young researchers projects of INDAM (Istituto Nazionale di Alta Matematica). Title of the project: *Light coordinates and spacetime topography*.

For the years 2008-2009 I have been the leader of young researchers projects of INDAM (Istituto Nazionale di Alta Matematica). Title of the project: *Sistemi di Posizionamento Globale relativistici*

2017 List of publications

- 1) Bini D., Geralico A., Jantzen R.T.,
Gyroscope precession along general timelike geodesics in a Kerr black hole spacetime
Phys. Rev. D 95, 124022 (2017)
DOI: 10.1103/PhysRevD.95.124022
e-print arXiv:1703.09525 [gr-qc].
- 2) Bini D., Geralico A., Ortolan A.,
Deviation and precession effects in the field of a weak gravitational wave
Phys. Rev. D 95, 104044 (2017)
DOI: 10.1103/PhysRevD.95.104044
- 3) Bini D., Chicone C., Mashhoon B.,
Relativistic Tidal Acceleration of Astrophysical Jets
Phys. Rev. D 95, 104029 (2017)
DOI: 10.1103/PhysRevD.95.104029
- 4) Bini D., Geralico A.

Hyperbolic-like elastic scattering of spinning particles by a Schwarzschild black hole
Gen. Rel. Gravit. 49, 84 (2017)
DOI:10.1007/s10714-017-2247-2

- 5) Kavanagh C., Bini D., Damour T., Hopper S., Ottewill A.C., Wardell B.,
Spin-orbit precession along eccentric orbits for extreme mass ratio black hole binaries and its effective-one-body transcription
Phys. Rev. D 96, 064012 (2017)
DOI:10.1103/PhysRevD.96.064012
e-print arXiv:1706.00459 [gr-qc].
- 6) Bini D., Damour T.,
Gravitational scattering of two black holes at the fourth post-Newtonian approximation
Phys. Rev. D, 96, 064021 (2017)
DOI:10.1103/PhysRevD.96.064021
e-print arXiv:1706.06877v1 [gr-qc]
- 7) Bini D., Geralico A., Jantzen R.T.,
Position determination and strong field parallax effects for photon emitters in the Schwarzschild spacetime
Gen. Rel. Grav. 49, no. 12, 151 (2017)
[arXiv:1707.00955 [gr-qc]].
- 8) Bini D., Geralico A., Vines J.,
Hyperbolic scattering of spinning particles by a Kerr black hole
Phys. Rev. D 96, no. 8, 084044 (2017)
doi:10.1103/PhysRevD.96.084044
[arXiv:1707.09814 [gr-qc]].
- 9) Bini D., Chicone C., Mashhoon B.,
Anisotropic gravitational collapse and cosmic Jets
Phys. Rev. D 96, no. 8, 084034 (2017)
doi:10.1103/PhysRevD.96.084034
[arXiv:1708.01040 [gr-qc]].
- 10) Bini D., Damour T.,
Gravitational spin-orbit coupling in binary systems, post-Minkowskian approximation and effective one-body theory
Phys. Rev. D, 96, 104038 (2017)
doi:10.1103/PhysRevD.96.104038
e-print arXiv: 1709.00590 [gr-qc]

Thomas Buchert



Position: Professor of Cosmology

Staff Member of CRAL, Head of Cosmology Group :

Université Lyon 1 and École Normale Supérieure Lyon

Adjunct Professor of the Faculty : ICRANet

Period covered: January 2017 - December 2017

I Scientific Work

(i) Investigation of (Lagrangian) perturbative models in relativistic cosmology including gravitational waves and pressure at first order. Investigation of gravitational entropies in relation to the Penrose conjecture.

(ii) Observational bounds on the age of the Universe.

(iii) Model-independent analysis of non-Gaussianity in Planck CMB data using Minkowski Functionals. New statistical tools: homology and persistence.

(iv) Generalization of scalar averaging schemes for arbitrary 3+1 foliations of space-time and arbitrary fluid content. Covariant formulation of the averaging framework.

II Conferences and educational activities

II a Conferences and Other External Scientific Work

- LOC and SOC : Workshop on "Inhomogeneous Cosmologies", Torun, Poland (July 2017).

- Doctoral School at Strasbourg Observatory, France (October 2017).

II b Work With Students

1 PhD student: Pierre Mourier (ongoing).

II c Diploma thesis supervision:

1 Master student M2 (Quentin Vigneron ; 1-year extended stage) ; 1 exchange student from India (Rahul Dhurkunde).

II d Other Teaching Duties see below.

II e. Work With Postdocs :

Collaboration with Alexander Wiegand (CfA Harvard, U.S.A.). Collaboration with Jan J. Ostrowski who is a new Postdoc at CRAL, financed by the Excellence Cluster LIO (Lyon Institut of Origins). Collaboration with Pratyush Pranav who is a new Postdoc at CRAL, financed by the ERC advanced Grant "ARTHUS, PI: T. Buchert" since November 2017.

III. Service activities [activities carried out in collaboration with ICRANet (e.g. teaching activities, conferences etc...) and outside ICRANet (teaching activities in your university etc...)]

III a. *Within ICRANet* : None.

III b. *Outside ICRANet* :

Management of ERC advanced grant "ARTHUS, PI: T. Buchert", since September 2017.
Master Course on "Cosmology and Gravitational Systems" (M2), Tutorials for upcoming teachers,
Exercises in "Introduction to General Relativity", all at École Normale Supérieure, Lyon.

IV. Other Memberships in the *Euclid consortium* ("Theory" and "Clustering"), and in *4MOST*.

2017 List of Publications

peer-reviewed - in preparation

ad (i) - Li Y.-Z., Mourier P., Buchert T., Wiltshire D.L.: 'Lagrangian theory of structure formation in relativistic cosmology V: Perfect Fluids'. In preparation (2017).

ad (i) - Buchert T., Mourier P., Ostrowski J.J.: 'Lagrangian theory of structure formation in relativistic cosmology VI: Gravitational entropies and the Penrose conjecture'. In preparation (2017).

ad (iv) - Buchert T., Mourier P., Roy X.: 'On average properties of inhomogeneous fluids in general relativity III: General fluid cosmologies in arbitrary 3+1 foliations'. In preparation (2017).

peer-reviewed - published

ad (i) - Al Roumi F., Buchert T., Wiegand A.: 'Lagrangian theory of structure formation in relativistic cosmology IV: Lagrangian approach to gravitational waves'. *Phys. Rev. D* 96, 123538 (2017).

ad (ii) Roukema B.F., Mourier P., Buchert T., and Ostrowski J.J.: 'The background Friedmannian Hubble constant in relativistic inhomogeneous cosmology and the age of the Universe'. *Astron. Astrophys.* 598, A111 (2017).

ad (iii) - Buchert T., France M.J., and Steiner F.: 'Model-independent analyses of non-Gaussianity in Planck CMB maps using Minkowski Functionals'. *Class. Quant. Grav.* 34, 094002 (2017). (Invited Article for Focus Issue 'Planck and fundamentals of cosmology').

invited papers:

Buchert T., Coley A.A., Kleinert H., Roukema B.F., Wiltshire D.L.: 'Observational Challenges for the Standard FLRW Model'. in *Proceedings of the Fourteenth Marcel Grossmann Meeting on General Relativity, Rome 2015*, M. Bianchi, R.T. Jantzen, R. Ruffini (eds.), Singapore: World Scientific, 622-638 (2017). - Report on MGIV DE3 Parallel Session. (Review published in: *Int. J. of Mod. Phys. D* 25, 1630007 (2016).)

Ostrowski J.J., Buchert T., Roukema B.F.: 'On the relativistic mass function and averaging in cosmology'. in *Proceedings of the Fourteenth Marcel Grossmann Meeting on General Relativity, Rome 2015*, M. Bianchi, R.T. Jantzen, R. Ruffini (eds.), Singapore: World Scientific, 2333-38 (2017).

Al Roumi F., Buchert T.: 'Relativistic structure formation models and gravitoelectromagnetism'. in *Proceedings of the Fourteenth Marcel Grossmann Meeting on General Relativity, Rome 2015*, M. Bianchi, R.T. Jantzen, R. Ruffini (eds.), Singapore: World Scientific, 2345-50 (2017).

Roukema B.F., Ostrowski J.J., Buchert T., Mourier P.: 'Order-unity argument for structure-generated "extra" expansion'. *Acta Physica Polonica B* 10, 403-406 (2017).

Ostrowski J.J., Buchert T., Roukema B.F.: 'Mass function of galaxy clusters in relativistic inhomogeneous cosmology'
Acta Physica Polonica B 10, 407-411 (2017).

De Lima, Rafael

Positions:

- Adjunct Professor
 - Coordinator of the ICRANet/UDESC International Agreement
 - Postdoc
- Period covered: 2014 - 2016



I Scientific Work

Compact objects: SGRs/AXPs, white dwarfs and neutron stars. Pulsed fraction of neutron stars.

II Conferences and educational activities

“Study of equations of state for neutron stars to model pulsed fractions”, INPE (Brazilian National Institute for Space Research), invited speaker (2017)

S.V. Borges, C. V. Rodrigues, J. G. Coelho M. Malheiro, e R. Lima. “Can Soft Gamma-Ray Repeaters and Anomalous X-Ray Pulsars be described as white dwarfs?”. Boletim da Sociedade Astronomica Brasileira, 29 (2017)

2017 List of Publication

De Lima, Rafael C. R.; COELHO, JAZIEL G. ; MALHEIRO, MANUEL ; RUEDA, JORGE A. ; RUFFINI, REMO . SGRs/AXPs as Rotation-Powered Neutron Stars. INTERNATIONAL JOURNAL OF MODERN PHYSICS: SERIES, v. 45, p. 1760030, 2017.

MALHEIRO, M. ; COELHO, JAZIEL G. ; CÁCERES, D. L. ; DE LIMA, R. C. R. ; LOBATO, R. V. ; RUEDA, J. A. ; RUFFINI, R. . Possible rotation-power nature of SGRs and AXPs. JOURNAL OF PHYSICS. CONFERENCE SERIES (PRINT), v. 861, p. 012003, 2017.

CHAKRABARTI SANDIP KUMAR

Position: Senior Professor and Head,
Astrophysics & Cosmology, SNBNCBS
and In Charge, Indian Centre for Space Physics
Period covered: 2017



I Scientific Work

I have concentrated on the study of matter around galactic and extragalactic black holes and their emission properties. I also fit the satellite data using our model and extract flow parameters such as the mass of the black hole, accretion rates of matter etc. This work is now extended to include flows around neutron stars. I am involved in numerical simulations with and without the effects of bending of photons due to strong gravity.

In Astrochemistry, we study complex molecule formation in star forming regions as a function of its initial compositions, age and presence/absence of UV radiations around. We concentrate on the formation of bio-molecules in particular.

In Ionospheric physics we study the influence of extra-terrestrial radiations on the radio signals propagating in the earth-ionosphere wave guide. Our models are used to compute changes in ionospheric parameters by Solar X-rays, solar eclipses, Gamma-Ray Bursts and Soft Gamma Ray repeaters etc.

Apart from these I am also involved in optical astronomy and installed a 24 inch telescope in ICSP to study exo-planets. I am also in charge of the low-cost balloon experiments done in near space.

II Conferences and educational activities

II a Conferences and Other External Scientific Work

Collaborated with Prof. D. Balsara and Dr. S. Garain at University of Notre Dame, USA, on hydro-simulations of matter around Kerr black holes and MHD simulations around Schwarzschild black hole. Also attended ACS meeting in Washington DC to present recent works on Astrochemistry. I also attended the COSPAR meeting in Jeju on Small Satellites and was the Chairman of a session and presented our work on low-cost balloons in near space.

II b Work With Students

Several students completed PhD work and submitted their Thesis in 2017. Some also received PhD degree. The names of the students are:

Victor Nwankwo (Nigeria)

Shree Ram Nagarkoti (Nepal)

Asit Choudhury (India)

Suman Chakraborty (India)

Aslam Ali Molla (India)

Arka Chatterjee (India)

Another ten students are continuing PhD work with me. So far 38 students submitted PhD (Doctoral) Thesis under my supervision

II c Diploma thesis supervision

II d Other Teaching Duties: I have taken two credit courses at S.N. Bose National Centre on Introduction to Astrophysics and High Energy Astrophysics.

II e. Work With Postdocs: I had one Post-Doctoral student named Dr. (Ms.) Indrani Banerjee who worked on black hole satellite data analysis

III. Service activities*[activities carried out in collaboration with ICRANet (e.g. teaching activities, conferences et c...) and outside ICRANet (teaching activities in your university etc...)]*

III a. Within ICRANet These activities mainly include short-listing applications who appear for IRAP PhD course.

III b. Outside ICRANet

IV. Other

2017 List of Publication

The following publications are in Refereed Journals.

1. A. CHATTERJEE, S.K. CHAKRABARTI, H. GHOSH, 2017, Images and spectral properties of two-component advective flows around black holes: effects of photon bending, MNRAS, 465, 3902
2. Etim, E. E., Gorai, P., Das, A., CHAKRABARTI, S. K., Arunan, E., 2016, Systematic Theoretical Study on the Interstellar Carbon Chain Molecules, ApJ, 832, 144.
3. A.A. Molla, S.K. CHAKRABARTI, D. DEBNATH, S. MONDAL, 2017, Estimation of Mass of Compact Object in H 1743-322 from 2010 and 2011 Outbursts using TCAF Solution and Spectral Index–QPO Frequency Correlation, ApJ, 834, 88.
4. M. Sil, P. Gorai, A. Das, D. Sahu, S. K. CHAKRABARTI, 2017, Adsorption energies of H and H₂: a quantum-chemical study, The European Physical Journal D, 71, 45
5. P. Gorai, A. Das, A. Das, B. Sivaraman, E.E. Etim, S.K. CHAKRABARTI, 2017, A Search for Interstellar Monohydric Thiols, ApJ, 836, 70
6. P. Gorai, A. Das, L. Majumdar, S.K. CHAKRABARTI, B. Sivaraman, E Herbst, 2017, Possibility of Forming Propargyl Alcohol in the Interstellar Medium, Molecul. Astrophys., 6, 36

7. S.K. Maji, S.K. CHAKRABARTI, D. Sanki and S. Pal, 2017, Topside ionospheric effects of the annular solar eclipse of 15th January 2010 as observed by DEMETER satellite, JASTP, 159, 1
8. P. Pal, S. SASMAL, S.K. CHAKRABARTI, 2017, Studies of Seismo-Ionospheric Correlations using Anomalies in Phase of Very Low Frequency Signal, Geomatics, Natural Hazards and Risk, V. 8, No. 2, 167-176
9. R. SARKAR, S.K. CHAKRABARTI, P.S. PAL, D. BHOUMICK, A. BHATTACHARYYA, Measurement of secondary cosmic ray intensity at Pfozter height using low-cost weather balloons and its correlation with solar activity, 2017, Advances of Space Res. 60, 991
10. S. K. CHAKRABARTI, R. Sarkar, D. Bhawmick, A. Bhattacharya, Study of high energy phenomena from near space using low-cost meteorological balloons, 2017, Experimental Astronomy, 43, 311
11. S. Chakraborty, S. Sasmal, T. Basak, S. Ghosh, S. Palit, S.K. CHAKRABARTI, S. Ray, 2017, Numerical Modeling of possible lower ionospheric anomalies associated with Nepal Earthquake Dependence of Sub-Ionospheric Very Low Frequency (VLF) Signal Propagation Characteristics on Lower Ionospheric Parameters During Nepal Earthquake in May, 2017, Advances of Space Research, 60, 1787
12. S. Pal, Hobara Y., CHAKRABARTI S.K., and Schnoor P. W., 2017, Effects of the major Sudden Stratospheric Warming event of 2009 on the sub-ionospheric Very Low Frequency/Low Frequency radio signals, Journal of Geophysical Research (Space Physics), 122, 7555
13. S. Ghosh, S. Sasmal, S. K. Midya and S.K. CHAKRABARTI, 2017, Unusual Change in Critical Frequency of F2 Layer during and Prior to Earthquakes, Open Journal of Earthquake Research, DOI: 10.4236/ojer.2017.64012
14. A. Deb, K. Giri, S.K. CHAKRABARTI, Dynamics of Magnetic Flux Tubes in an Advective Flow around a Black Hole, 2017, MNRAS, 472, 1259
15. A. BHATTACHARJEE, CHAKRABARTI, S. K., 2017, Monte-Carlo Simulations of Thermal Comptonization Process in a Two Component Advective Flow around a Neutron Star, MNRAS, 472, 1361
16. S. Sasmal, T. Basak, S. Chakraborty and S. K. CHAKRABARTI, 2017, Modeling of temporal variation of Very Low Frequency (VLF) radio waves over very long paths as observed from Indian Antarctic stations Maitri and Bharati using Solar Zenith Angle Model and LWPC, J. Geophys. Res. (Space Physics), 122, 7698
17. S. Mondal, S.K. CHAKRABARTI, S. Nagarkoti and P. Arevalo, 2017, Possible range of viscosity parameter to trigger black hole candidates to exhibit outbursts, Astrophysical Journal, 850, 47
18. S. Chakraborty, S. Sasmal, S.K. CHAKRABARTI, 2017, Observational signatures of unusual outgoing longwave radiation (OLR) and atmospheric gravity waves (AGW) as precursory effects of May 2015 Nepal Earthquakes, Journal of Geometrodynamics (In press)
19. A. Jana, S.K. CHAKRABARTI, D. Debnath, 2017, Detection of X-ray Jets during 2005 Outburst of Swift J1753.5-0127: Spectral Study with TCAF Solution, ApJ, 850:91
20. A. Roy and S.K. CHAKRABARTI, 2017, Hydrodynamic simulations of accretion flows with time varying viscosity, MNRAS, 472, 4689
21. D. Debnath, A. Jana, S.K. CHAKRABARTI, S. Mondal and D. Chatterjee, 2017, Accretion Flow Properties of Swift J1753.5-0127 during its 2005 outburst, ApJ, 850:92

22. J. Kim, S. Garain, D. Balsara , S.K. CHAKRABARTI, 2017, General Relativistic Numerical Simulation of sub-Keplerian Transonic Accretion Flows onto Black Holes: Schwarzschild Spacetime, 472, 542
23. Chatterjee, A., S.K. CHAKRABARTI, Ghosh, H., 2017, Temporal evolution of photon energy emitted from two-component advective flows: origin of time lag, MNRAS, 472, 1361

CHARDONNET Pascal

Position: Professeur des Universités
Adjunct Professor of the ICRANet Faculty
Period covered: 2015



I Scientific Work

The formation of the first stars hundreds of millions years after the Big-Bang marks the end of what it is called the « Dark Ages ». Currently, we have no direct observations on how the primordial stars formed. This new window is paramount of importance in astrophysics and cosmology. Certainly, the new generation of telescopes will test these theoretical ideas about the formation of the primordial stars. Today's telescopes cannot look far enough into the cosmic past to observe the formation of the first stars. If we want to see that process, we need sophisticated numerical simulations. Pop III stars also have a potential to produce gamma-ray bursts (GRBs). GRBs may provide one of the most promising methods of directly probing the final stages of Pop III stars.

In this proposal we intend to develop a numerical code to study the explosion of such massive stars and to develop observational consequences (astrophysical and cosmological) of these results to the Pop III stars. Hydrodynamical simulations will be performed with our own numerical code based on the Piecewise Parabolic Method on a Local stencil. Extension of PPML-code to full 3D case to study the 3D hydrodynamic effects on the explosion of a star with realistic physics. This includes implementation of full equation of state of the stellar matter, self-gravity computations, radiation transfer implementation.

II Conferences and educational activities

II a Conferences and Other External Scientific Work

II b Work With Students

II c Diploma thesis supervision

Andrey Baranov (2010-2013):

On Pair Instability Supernovae Explosion and Gamma-Ray Bursts

Now Andrey is researcher at Kurtchatov Institute Moscow

Anastasia Filina (2012-2015)

Explosive Phenomena in Astrophysics: Gamma-Ray Bursts and Supernovae

Now Anastasia is researcher in Keldysh Institute of Applied Mathematics Moscow.

II d Other Teaching Duties

Teaching activity at University of Savoie-PRES Université Grenoble

II e. Work With Postdocs

Mikhail Popov: Post-doc in LAPTH Annecy, then in CRAL ENS Lyon

III. Service activities [*activities carried out in collaboration with ICRANet (e.g. teaching activities, conferences etc...) and outside ICRANet (teaching activities in your university etc...)*]

III a. Within ICRANet

Coordinator of EMJD IRAP PhD Program

Co-Advisor of Giovanni Pisanni

III b. Outside ICRANet

Russian Institute for Advanced Study, Moscow

Project on Art and Science

IV. Other

Project of Joint Euro Mediterranean Master on Big Data and Space Sciences with Emirates and Lebanon

2015 List of Publication

1) A.A. Baranov, P. Chardonnet, V.M. Chechetkin, A.A. Filina, M.V. Popov, **Aspherical Nucleosynthesis in the He-layer of a Core-collapse Supernova Using the Tracer Particles Method, 2013**

The Astrophysical Journal Volume 783 page 43 (2014)

2) A.A. Baranov, P. Chardonnet, V.M. Chechetkin, A.A. Filina, M.V. Popov, **Multidimensional Simulations of Pair-Instability Supernovae, 2013**

Astronomy & Astrophysics Volume 558 page A10 (2013)

Meeting

P. Chardonnet , A.A. Baranov, V.M. Chechetkin, A.A. Filina, M.V. Popov,

Gamma-Ray Bursts appear simpler than expected ?

IOFFE Conference, September 21-27, 2014, Saint-Petersburg, Russia

P. Chardonnet , A.A. Baranov, V.M. Chechetkin, A.A. Filina, M.V. Popov,

Cosmic Gamma-Ray Bursts from Primordial Stars: a new Renaissance in Astrophysics ?

Fourth Galileo-Xu Guangqi Meeting, May 5-8-, 2015, Beijing, China

P. Chardonnet , A.A. Baranov, V.M. Chechetkin, A.A. Filina, M.V. Popov,

On Gamma-Ray Bursts Spectra: a possible understanding

2nd Cesar Lattes Meeting, April 13-18, 2015, Rio de Janeiro Brazil

P. Chardonnet

Artium Mater in Relativistic Astrophysics: new perspective for a European-Latin American PhD Program

2nd Cesar Lattes Meeting, April 13-18, 2015, Rio de Janeiro Brazil

CherubiniChristian

Position: Associate Professor in Mathematical Physics (MAT/07).
Engineering Departmental Faculty, University “Campus Bio-Medico”, Via A. del Portillo 21, I-001285 Rome, Italy
And
Adjunct Professor in ICRANet Faculty.

Period covered: position at ICRANet started on September 11th 2017



I Scientific Work

- Astrophysics of self-gravitating fluids.
- Electrodynamics round black holes.
- Numerical Relativity.
- Fluid dynamics and analogue gravity
- Theoretical biophysics.

II Conferences and educational activities

II a Conferences and Other External Scientific Work

- Scientific Meeting GNFM (May 4th 2017-May 6th 2017), Montecatini (Italy)
- Fifth Bego Rencontres (May 15th 2017-May 19th 2017), Nice (France) e Rome (Italy)

II b Work With Students

At the moment Prof. Cherubini, together with Prof. S. Filippi, Prof. Ruffini and Prof. Xue, is working with the ICRANet PhD students Rahim Moradi and Wang Yu on problems of black hole magnetohydrodynamics around Kerr black holes and other aspect of the mathematical theory of black holes.

II c Diploma thesis supervision

II d Other Teaching Duties

II e. Work With Postdocs

III. Service activities [*activities carried out in collaboration with ICRANet (e.g. teaching activities, conferences etc...) and outside ICRANet (teaching activities in your university etc...)*]

III a. Within ICRANet

- Participation to the "Collegio di Dottorato" of the INTERNATIONAL RELATIVISTIC ASTROPHYSICS PH.D."
- Faculty Member of the Fifth Bego Rencontres (May 15th 2017-May 19th 2017), Nice (France) e Rome (Italy)

III b. Outside ICRANet

- Lecturer "Electromagnetism" (Engineering Departmental Faculty, University Campus Bio-Medico of Rome).
- Lecturer "Mathematical Physics Models for Engineering" (Engineering Departmental Faculty, University Campus Bio-Medico of Rome).

IV. Other

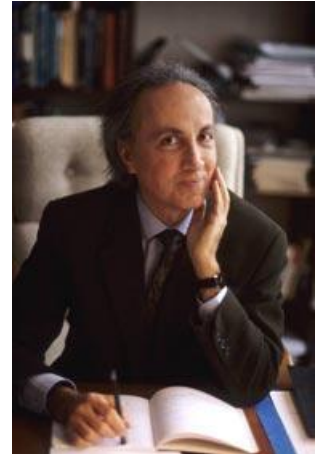
Prof. Cherubini has a longstanding collaboration with other ICRANET scientists. In particular in collaboration with Dr Andrea Geralico, Dr Donato Bini, Prof. Robert T Jantzen, Prof. Remo Ruffini and Dr. J Rueda, he has written several articles in various areas of General Relativity. With Prof. Simonetta Filippi he is involved in research activities in the fields of Stellar and Galactic Structures, Effective Geometries and Complex Systems in Nature.

2017 List of Publication

- Gizzi A, Loppini A, Cherry EM, Cherubini C, Fenton FH, Filippi S (2017). *Multi-band decomposition analysis: application to cardiac alternans as a function of temperature*. *PHYSIOLOGICAL MEASUREMENT*, vol. 38, p.833-847, ISSN: 0967-3334, doi: <https://doi.org/10.1088/1361-6579/aa64af>
- Rueda JA, Aimuratov Y, Barres de Almeida U, Becerra L, Bianco CL, Cherubini C, Filippi S, Karlica M, Kovacevic M, Melon Fuksman J D, Moradi R, Muccino M, Penacchioni AV, Pisani GB, Primorac D, Ruffini R, Sahakyan N, Shakeri S, Wang Y (2017). *The binary systems associated with short and long gamma-ray bursts and their detectability*. *INTERNATIONAL JOURNAL OF MODERN PHYSICS D*, vol. 26, p.1730016-1-1730016-19, ISSN: 0218-2718, doi: DOI:10.1142/S0218271817300166
- Gizzi A, Loppini A, Ruiz-Baier R, Ippolito A, Camassa A, La Camera A, Emmi E, Di Perna L, Garofalo V, Cherubini C, Filippi S (2017). *Nonlinear diffusion and thermo-electric coupling in a two-variable model of cardiac action potential*. *CHAOS*, vol. 27, p. 093919-1-093919-11, ISSN:1054-1500, doi: doi: 10.1063/1.4999610
- Cherubini C, Filippi S, Gizzi A, Ruiz-Baier R (2017). *A note on stress-driven anisotropic diffusion and its role in active deformable media*. *JOURNAL OF THEORETICAL BIOLOGY*, vol. 430, p. 221-228, ISSN: 0022-5193, doi: <http://dx.doi.org/10.1016/j.jtbi.2017.07.013>

- Cipolletta F, Cherubini C, Filippi S, Rueda j A and Ruffini R (2017). *Last stable orbit around rapidly rotating neutron stars*. PHYSICAL REVIEW D, vol. 96, p. 024046-1-024046-10, ISSN: 2470-0010, doi:10.1103/PhysRevD.96.024046
- Gizzi A, Giannitelli SM, Trombetta M, Cherubini C, Filippi S, De Ninno A, Businaro L, Gerardino A, Rainer A (2017). *Computationally Informed Design of a Multi-Axial Actuated Microfluidic Chip Device*. SCIENTIFIC REPORTS, vol. 7, p. 1-11, ISSN: 2045-2322, doi:10.1038/s41598-017-05237-9
- Cipolletta F, Cherubini C, Filippi S, Rueda J A, Ruffini R (2017). *Equilibrium Configurations of Classical Polytropic Stars with a Multi-Parametric Differential Rotation Law: A Numerical Analysis*. COMMUNICATIONS IN COMPUTATIONAL PHYSICS, vol. 22, p. 863-888, ISSN: 1991-7120, doi:doi: 10.4208/cicp.OA-2017-0007

Damour Thibault



Position: : Professeur Permanent
Institut des Hautes Etudes Scientifiques
Period covered: 2014

I Scientific Work

Theoretical studies of :

1. dynamics and gravitational radiation of inspiralling and coalescing binary systems
2. quantum effects in early cosmology

II Conferences and educational activities

II a Conferences and Other External Scientific Work

April 2014 558 WE Heraeus Seminar on “The Strong Gravity Regime of Black Holes and Neutron Stars”,
Physikzentrum, Bad Honnef (Germany)

April 2014 Cooks Branch Meeting, Great Brampton House (UK)

May 2014 Studium Conference “Gravitation, Solitons and Symmetries”, Tours (France)

October 2014 26th Solvay Conference on Physics, Astrophysics and Cosmology, Brussels (Belgium)

II b Work With Students

Discussions with Philipp Fleig (IRP PhD student) who has just started a postdoctoral stay at IHES

II e. Work With Postdocs

Work with Alessandro NAGAR on the dynamics and gravitational radiation of inspiralling and coalescing binary systems

IV. Other

ICRANET-related Collaborations with Donato BINI

2014 List of Publications

- 1 Gravitational self-force corrections to two-body tidal interactions and the effective one-body formalism
· Donato Bini, Thibault Damour. Sep 24, 2014. 38 pp.
e-Print: [arXiv:1409.6933 \[gr-qc\]](#) |
—
- 2 Review of Particle Physics
· Particle Data Group Collaboration (K.A. Olive (Minnesota U.) *et al.*). 2014. 1676 pp.
Published in **Chin.Phys. C38 (2014) 090001**
- 3 A new effective-one-body description of coalescing nonprecessing spinning black-hole binaries
· Thibault Damour, Alessandro Nagar. Jun 26, 2014. 13 pp.
e-Print: [arXiv:1406.6913 \[gr-qc\]](#) |
—
- 4 Quantum Supersymmetric Bianchi IX Cosmology
· Thibault Damour (IHES, Bures-sur-Yvette), Philippe Spindel (UMH, Mons). Jun 5, 2014. 94 pp.
Published in **Phys.Rev. D90 (2014) 103509**
- 5 A new analytic representation of the ringdown waveform of coalescing spinning black hole binaries
· Thibault Damour, Alessandro Nagar. Jun 2, 2014. 7 pp.
e-Print: [arXiv:1406.0401 \[gr-qc\]](#) |
—
- 6 Two-body gravitational spin-orbit interaction at linear order in the mass ratio
· Donato Bini, Thibault Damour. Apr 10, 2014. 22 pp.
Published in **Phys.Rev. D90 (2014) 024039**
DOI: 10.1103/PhysRevD.90.024039
e-Print: [arXiv:1404.2747 \[gr-qc\]](#) |
—
- 7 Analytic determination of the eight-and-a-half post-Newtonian self-force contributions to the two-body
· gravitational interaction potential
Donato Bini, Thibault Damour. Mar 10, 2014. 13 pp.
e-Print: [arXiv:1403.2366 \[gr-qc\]](#) |
—
- 8 Strong-Field Scattering of Two Black Holes: Numerics Versus Analytics
· Thibault Damour, Federico Guercilena, Ian Hinder, Seth Hopper, Alessandro Nagar, Luciano Rezzolla. Feb 28, 2014. 5 pp.
Published in **Phys.Rev. D89 (2014) 081503**
DOI: 10.1103/PhysRevD.89.081503
e-Print: [arXiv:1402.7307 \[gr-qc\]](#) |
- 9 Nonlocal-in-time action for the fourth post-Newtonian conservative dynamics of two-body systems
· Thibault Damour (IHES, Bures-sur-Yvette), Piotr Jaranowski (Bialystok U.), Gerhard Schäfer (Jena U., TPI).
Jan 18, 2014. 18 pp.
Published in **Phys.Rev. D89 (2014) 064058**
DOI: 10.1103/PhysRevD.89.064058
e-Print: [arXiv:1401.4548 \[gr-qc\]](#) |
—
- 1 The general relativistic two body problem
0 Thibault Damour. Dec 12, 2013. 43 pp.
· e-Print: [arXiv:1312.3505 \[gr-qc\]](#) |

- 1 High-order post-Newtonian contributions to the two-body gravitational interaction potential from analytical
1 gravitational self-force calculations
- . Donato Bini, Thibault Damour. Dec 9, 2013. 21 pp.
e-Print: **arXiv:1312.2503 [gr-qc]** |
- 1 Error-analysis and comparison to analytical models of numerical waveforms produced by the NRAR
2 Collaboration
- . Ian Hinder (Albert Einstein Inst.), Alessandra Buonanno (Maryland U.), Michael Boyle (Cornell U.),
Zachariah B. Etienne (Illinois U., Urbana (main)), James Healy (Sukhumi, FTT), Nathan K. Johnson-
McDaniel (U. Jena (main)), Alessandro Nagar (IHES, Bures-sur-Yvette), Hiroyuki Nakano (Kyoto U. &
Rochester Inst. Tech.), Yi Pan (Maryland U.), Harald P. Pfeiffer (Canadian Inst. Advanced Res. & Toronto
U.) *et al.*. Jul 19, 2013. 47 pp.
Published in **Class.Quant.Grav.** **31 (2014) 025012**
- 1 Merger states and final states of black hole coalescences: a numerical-relativity-assisted effective-one-body
3 approach
- . Thibault Damour, Alessandro Nagar, Loic Villain. Jul 10, 2013. 10 pp.
Published in **Phys.Rev.** **D89 (2014) 024031**
DOI: 10.1103/PhysRevD.89.024031
e-Print: **arXiv:1307.2868 [gr-qc]** |

Della Valle Massimo

Position: Adjunct Professor of the ICRANet Faculty



2014 List of Publication

1. SN2012ca: a stripped envelope core-collapse SN interacting with dense circumstellar medium

Inserra, C. et al. 2014, MNRAS, 437, L51

2. X-ray monitoring of classical novae in the central region of M 31 III. Autumn and winter 2009/10, 2010/11, and 2011/12

Henze, M. et al. 2014, A&A, 563, 2

3. The Type IIP Supernova 2012aw in M95: Hydrodynamical Modeling of the Photospheric Phase from Accurate Spectrophotometric Monitoring

Dall'Ora, M. et al. 2014, ApJ, 787, 139

4. Diversity of gamma-ray burst energetics vs. supernova homogeneity: SN 2013cq associated with GRB 130427A

Melandri, A. et al. 2014, A&A, 567, 29

5. Life after eruption - IV. Spectroscopy of 13 old novae

Tappert, C. et al. 2014, MNRAS, 442, 565

6. A search for Fermi bursts associated with supernovae and their frequency of occurrence

Kovacevic, M. et al. 2014, A&A, 569, 108

7. On the origin of short GRBs with extended emission and long GRBs without associated SN

van Putten, M. et al. 2014, MNRAS, 444, L58

8. On the 2011 outburst of the Recurrent Nova T Pyxidis

Izzo, L., Della Valle, M. & Henze, M. 2014, Proceedings of the conference "The Golden Age of Cataclysmic Variables and Related Objects II", Palermo, 9-14 September 2013. To be published in Acta Polytechnica. 2014arXiv1407.7076I

9. Core-collapse and Type Ia supernovae with the SKA

Perez-Torres, M.A. et al. 2014, Proceedings of the Advancing Astrophysics with the Square Kilometre Array Conference.

2014arXiv1409.1827P

10. Extending the supernova Hubble diagram to $z \sim 1.5$ with the Euclid space mission

Astier, P. et al. 2014, A&A, in press. 2014arXiv1409.8562A

11. SN 2012ec: mass of the progenitor from PESSTO follow-up of the photospheric phase

Barbarino, C. et al. 2014, A&A, in press. 2014arXiv1410.8393B

12. Supersolar Ni/Fe production in the Type IIP SN 2012ec

Jerkstrand, A. et al. 2014, MNRAS, submitted. 2014arXiv1410.8394J

13. PESSTO : survey description and products from the first data release by the Public ESO Spectroscopic Survey of Transient Objects

Smartt, S. et al. 2014, A&A, submitted

http://adsabs.harvard.edu/cgi-bin/nph-data_query?bibcode=2014arXiv1407.7076I&db_key=PRE&link_type=ABSTRACT&high=5106af309e22011

Einasto Jaan

Position: senior research fellow

Period covered: Januar 1, 2014 - November 18, 2014



I Scientific Work

Together with Maret Einasto and collaborators I studied the morphology and galaxy content of SDSS DR8 superclusters (Einasto et al., 2014a). We found the supercluster morphology with

Minkowski functionals and analysed the probability density distributions of colours, morphological types, stellar masses, star formation rate (SFR) of galaxies, and the peculiar velocities of the main galaxies in groups in superclusters of filament and spider types, and in the field. We tested the statistical significance of the results with the KS test. Our results show that the fraction of red, early-type, low SFR galaxies in filament-type superclusters is higher than in spider-type superclusters; in low-density global environments their fraction is lower than in superclusters. In all environments the fraction of red, high stellar mass, and low SFR galaxies in rich groups is higher than in poor groups. In superclusters of spider morphology red, high SFR galaxies have higher stellar masses than in filament-type superclusters. Groups of equal richness host galaxies with larger stellar masses, a larger fraction of early-type and red galaxies, and a higher fraction of low SFR galaxies, if they are located in superclusters of filament morphology. The peculiar velocities of the main galaxies in groups from superclusters of filament morphology are higher than in those of spider morphology. Groups with higher peculiar velocities of their main galaxies in filament-type superclusters are located in higher density environment than those with low peculiar velocities. There are significant differences between galaxy populations of the individual richest superclusters. We came to the conclusion that both local (group) and global (supercluster) environments and even supercluster morphology play an important role in the formation and evolution of galaxies. Differences in the inner structure of superclusters of filament and spider morphology and the dynamical state of galaxy groups in them may lead to the differences found in our study.

Also in collaboration with Maret Einasto and colleagues from Finland and Korea Institute of Advanced Studies we investigated the possibility to trace the cosmic web at high redshifts with quasar systems (Einasto et al., 2014b,c). We traced the cosmic web at redshifts that range from $1.0 < z < 1.8$ by using the quasar (QSO) data from the SDSS DR7 QSO catalogue. We applied a friend-of-friend algorithm to the quasar and random catalogues to determine systems at a series of linking length and analysed richness and sizes of these systems. Our results indicate that at the linking lengths $l < 30 h^{-1} \text{ Mpc}$, the number of quasar systems is larger than the number of systems detected in random catalogues, and the systems themselves have smaller diameters than random systems. The diameters of quasar systems are comparable to the sizes of poor galaxy superclusters in the local Universe. The richest quasar systems have four members. The mean space density of quasar systems, $\sim 10^7 (h^{-1} \text{ Mpc})^{-3}$, is close to the mean space density of local rich superclusters. At intermediate linking lengths ($40 < l < 70 h^{-1} \text{ Mpc}$), the richness and length of quasar systems are similar to those derived from random catalogues. Quasar system diameters are similar to the sizes of rich superclusters and supercluster chains in the local Universe. The percolating system, which penetrate the whole sample volume appears in a quasar sample at a smaller linking length than in random samples ($85 h^{-1} \text{ Mpc}$). At

the linking length $70 h^{-1}$ Mpc, the richest systems of quasars have diameters exceeding $500 h^{-1}$ Mpc. Quasar luminosities in systems are not correlated with the system richness. We conclude that quasar system catalogues in our web pages and at the Strasbourg Astronomical Data Center (CDS) can serve as a database for searching superclusters of galaxies and for tracing the cosmic web at high redshifts.

I participated in the search for shell-like structures in the distribution of nearby rich clusters of galaxies drawn from the SDSS DR8, initiated by Marek Einasto (in preparation). We find the maxima in the distribution of distances from rich galaxy clusters to other groups and clusters at distance of about $120 h^{-1}$ Mpc suggesting a density enhancement at these distances from rich clusters, and possible indication of shell-like structures. The rich cluster A1795, the central cluster of the Bootes supercluster, has the highest maximum in the distance distribution of other groups and clusters around them at distance of about $120 h^{-1}$ Mpc among our rich cluster sample, and another maximum at a distance of about $240 h^{-1}$ Mpc. However, the radius of the possible shell is larger than expected for a BAO shell ($109 h^{-1}$ Mpc).

The book “Dark Matter and Cosmic Web Story” (Einasto, 2014a) is printed by World Scientific Publishing Co. The official presentation of the book took place in Tartu University on December 2, 2013. Additional presentations were held in Princeton University Astronomy Department and in the Estonian House in New York in March 2014. My talk on IAU Symposium 308 “The Zeldovich Universe: Genesis and Growth of the Cosmic Web” is published (Einasto, 2014b).

II Conferences and educational activities

II a Conferences and Other External Scientific Work

March 22 – March 31, Princeton University Astronomy Department, New York Estonian House;
June 15 – June 20, Moscow University Sternberg Institute, Space Research Institute to participate in the conference “Zeldovich100”;

June 22 – June 28, Tallinn, IAU Symposium No. 308, “The Zeldovich Universe: Genesis and Growth of the Cosmic Web”;

September 27 – October 05, New Haven, Reception of the the Gruber International Cosmology Prize;
November 1 – November 11, Seoul, Korea Institute of Advanced Science, participation in workshop “The 6th KIAS Workshop on Cosmology and Structure Formation”.

III. Service activities

III b. Outside ICRANet

Lectures

- January 31, lecture in the annual conference of Estonian Physics Society: “The Development of the World View on the Universe”;
- February 22, Tartu Observatory seminar: “Formation of the Cosmic Web”;
- March 24, Princeton University seminar: “Formation of the Cosmic Web”;
- March 29, New York Estonian House, lecture: “The Structure of the Universe”;
- April 04, Tartu University, discussion on topics: “Searching Dark Matter” with Dr. Martti Raidal;
- April 21, Tartu University, talk in honour of Prof. Ene Tiit: “Ene Tiit 80 – Pictures from the Beginning of the Path”;
- May 22, Estonian Academy of Sciences visiting Saaremaa, lecture: “The Structure and Evolution of the Universe”;
- June 16, Space Centre Institute, Moscow, talk on conference Zeldovich100: “Yakov

Zeldovich and the Formation of the Cosmic Web Paradigm”;

- June 27, Tallinn, talk on IAU Symposium No. 308, ‘The Zeldovich Universe: Genesis and Growth of the Cosmic Web’: “Yakov Zeldovich and the Cosmic Web Paradigm”;
- October 01, Yale University, Gruber Prize Ceremony talk: “Near Field Cosmology – My Way”;
- October 02, Yale University Astronomy Department, seminar talk: “Evolution of the Cosmic Web”;
- November 04, talk on The 6th KIAS Workshop on Cosmology and Structure Formation: “The Cosmic Web Paradigm – Status and Problems”;
- November 10, talk on seminar of the Korea Institute of Advanced Science: “Cosmology in Tartu Observatory”.

IV. Other

I am member of the International Astronomical Union (1961), Estonian Academy of Sciences (1981), American Astronomical Society (1981), European Astronomical Society (1990), Academia Europaea (1990), Royal Astronomical Society (1994).

I have Estonian Science Prizes (1982, 1998, 2003, 2007), The Estonian Order of the National Coat of Arms (1998), Marcel Grossmann Award (2009), honorary Doctor of Tartu University (2010), Viktor Ambartsumian International Prize (2012), Doctor Honoris Causa degree of the Turku University (2013), Gruber International Cosmology Award (2014).

2014 List of Publication

- Einasto, J. 2014a, Dark Matter and Cosmic Web Story (World Scientific Publishing Co)
- Einasto, J. 2014b, Yakov Zeldovich and the Cosmic Web Paradigm, ArXiv: 1410.6932, Proceedings IAU Symposium No. 308, ‘The Zeldovich Universe: Genesis and Growth of the Cosmic Web’
- Einasto, M., Lietzen, H., Tempel, E., Gramann, M., Liivamägi, L. J., & Einasto, J. 2014a, SDSS superclusters: morphology and galaxy content, A&A, 562, A87
- Einasto, M., Tago, E., Lietzen, H., Park, C., Heinämäki, P., Saar, E., Song, H., Liivamägi, L. J., & Einasto, J. 2014b, Tracing a high redshift cosmic web with quasar systems, A&A, 568, A46
- Einasto, M., Tago, E., Lietzen, H., Park, C., Heinämäki, P., Saar, E., Song, H., Liivamäki, L. J., & Einasto, J. 2014c, VizieR Online Data Catalog: High redshift cosmic web with quasar systems (Einasto+, 2014), VizieR Online Data Catalog, 356, 89046

Filippi Simonetta

Position: Full Professor in Mathematical Physics (MAT/07).

Head, Laboratory of Non Linear Physics and Mathematical Modeling

Pro-Rector for Education, University “Campus Bio-Medico”,

Via A. del Portillo 21, I-001285 Rome, Italy,

Tel. +39-06-225419611

and

Adjunct Professor in ICRANet Faculty.



Period covered: position at ICRANet started on September 12th 2017

I Scientific Work

- Astrophysics of self-gravitating fluids.
- Electrodynamics round black holes.
- Numerical Relativity.
- Fluid dynamics and analogue gravity
- Theoretical biophysics.

II Conferences and educational activities

II a Conferences and Other External Scientific Work

- Scientific Meeting GNFM (May 4th 2017-May 6th 2017), Montecatini (Italy)

II b Work With Students

Prof. Filippi, together with Prof. C. Cherubini, Prof. Ruffini and Prof. Xue, is working with the ICRANetPhD students Rahim Moradi and Wang Yu on problems of relativistic magnetohydrodynamics around Kerr black holes.

II c Diploma thesis supervision

II d Other Teaching Duties

II e. Work With Postdocs

III. Service activities [activities carried out in collaboration with ICRANet (e.g. teaching activities, conferences etc...) and outside ICRANet (teaching activities in your university etc...)]

III a. Within ICRANet

Prof. Filippi serves as supervisor for IRAP PhD students.

III b. Outside ICRANet

- Lecturer “Dynamics of Complex Systems” (Engineering Departmental Faculty, University Campus Bio-Medico of Rome).
- Lecturer “Mathematical Physics Models for Engineering” (Engineering Departmental Faculty, University Campus Bio-Medico of Rome).
- Faculty of the “Science and Engineering for Humans and the Environment PH.D “ by University Campus Bio-Medico of Rome.

IV. Other

Prof. Filippi has a longstanding collaboration with ICRANET scientists. In particular in collaboration with Prof. Remo Ruffini she has written several articles on various aspects of Gravitational Physics. With Prof. Christian Cherubini, Dr Jorge Rueda, Dr Andrea Geralico and Dr Donato Bini she has been involved in research activities in the fields of Stellar and Galactic Structures, Effective Geometries and Complex Systems in Nature.

2017 List of Publication

- Gizzi A, Loppini A, Cherry EM, Cherubini C, Fenton FH, Filippi S (2017). *Multi-band decomposition analysis: application to cardiac alternans as a function of temperature*. PHYSIOLOGICAL MEASUREMENT, vol. 38, p.833-847, ISSN: 0967-3334, doi: <https://doi.org/10.1088/1361-6579/aa64af>
- Rueda JA, Aimuratov Y, Barres de Almeida U, Becerra L, Bianco CL, Cherubini C, Filippi S, Karlica M, Kovacevic M, Melon Fuksman J D, Moradi R, Muccino M, Penacchioni AV, Pisani GB, Primorac D, Ruffini R, Sahakyan N, Shakeri S, Wang Y (2017). *The binary systems associated with short and long gamma-ray bursts and their detectability*. INTERNATIONAL JOURNAL OF MODERN PHYSICS D, vol. 26, p.1730016-1-1730016-19, ISSN: 0218-2718, doi: DOI:10.1142/S0218271817300166
- Gizzi A, Loppini A, Ruiz-Baier R, Ippolito A, Camassa A, La Camera A, Emmi E, Di Perna L, Garofalo V, Cherubini C, Filippi S (2017). *Nonlinear diffusion and thermo-electric coupling in a two-variable model of cardiac action potential*. CHAOS, vol. 27, p. 093919-1-093919-11, ISSN:1054-1500, doi: doi: 10.1063/1.4999610
- Cherubini C, Filippi S, Gizzi A, Ruiz-Baier R (2017). *A note on stress-driven anisotropic diffusion and its role in active deformable media*. JOURNAL OF THEORETICAL BIOLOGY, v.430, p.221-228, ISSN:0022-5193, doi:<http://dx.doi.org/10.1016/j.jtbi.2017.07.013>
- Cipolletta F, Cherubini C, Filippi S, Rueda J A and Ruffini R (2017). *Last stable orbit around rapidly rotating neutron stars*. PHYSICAL REVIEW D, vol. 96, p. 024046-1-024046-10, ISSN: 2470-0010, doi:10.1103/PhysRevD.96.024046

- Gizzi A, Giannitelli SM, Trombetta M, Cherubini C, Filippi S, De Ninno A, Businaro L, Gerardino A, Rainer A (2017). *Computationally Informed Design of a Multi-Axial Actuated Microfluidic Chip Device*. SCIENTIFIC REPORTS, vol. 7, p. 1-11, ISSN: 2045-2322, doi:10.1038/s41598-017-05237-9
- Cipolletta F, Cherubini C, Filippi S, Rueda J A, Ruffini R (2017). *Equilibrium Configurations of Classical Polytropic Stars with a Multi-Parametric Differential Rotation Law: A Numerical Analysis*. COMMUNICATIONS IN COMPUTATIONAL PHYSICS, vol. 22, p. 863-888, ISSN: 1991-7120, doi:doi: 10.4208/cicp.OA-2017-0007
- Nestola M G C, Faggiano E, Vergara C, Lancellotti R M, Ippolito S, Antona C, Filippi S, Quarteroni A, Scrofani R (2017). *Computational comparison of aortic root stresses in presence of stentless and stented aortic valve bio-prostheses*. COMPUTER METHODS IN BIOMECHANICS AND BIOMEDICAL ENGINEERING, vol. 20, p. 171-181, ISSN: 1025-5842, doi: 10.1080/10255842.2016.1207171
- Bianchi D, Monaldo E, Gizzi A, Marino M, Filippi S, Vairo G (2017). *A FSI computational framework for vascular physiopathology: A novel flow-tissue multiscale strategy*. MEDICAL ENGINEERING & PHYSICS, vol. 47, p. 25-37, ISSN: 1350-4533, doi: 10.1016/j.medengphy.2017.06.028
- Loppini A, Pedersen M, Braun M, Filippi S (2017). *Gap-junction coupling and ATP-sensitive potassium channels in human β -cell clusters: Effects on emergent dynamics*. PHYSICAL REVIEW. E, vol. 96, p. 032403-1 - 032403-12, ISSN: 2470-0045, doi: 10.1103/PhysRevE.96.032403

Fisher Robert

Position: **Associate Professor** in Physics
Graduate Program Director
University of Massachusetts Dartmouth
285 Old Westport Road
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Email: robert.fisher@umassd.edu



Memberships: International Astronomical Union, American Physical Society, American Astronomical Society, National Society of Black Physicists

Period covered: 2017

I Scientific Work

- Type Ia Supernovae
- Star Formation
- Physics of the Interstellar Medium
- Turbulence and Combustion
- Computational Fluid Dynamics

II Conferences and educational activities

II a Conferences and Other External Scientific Work

Invited American Astronomical Society (AAS) 231 Meeting Plenary Lecture 1/12/18: “Fate of Exploding White Dwarfs”

Invited ASTRONUM 2017 Talk 6/29/2017

II b Work With Students

II c Diploma thesis supervision

II d Other Teaching Duties

II e. Work With Postdocs

III. Service activities [activities carried out in collaboration with ICRANet (e.g. teaching activities, conferences etc...) and outside ICRANet (teaching activities in your university etc...)]

III a. Within ICRANet

III b. Outside ICRANet

- Research advisor to 2 graduate students and 2 undergraduate students
- Graduate program director
- Instructor for classical mechanics, modern physics, and astrophysics courses

IV. Other

2017 List of Publication

O. Graur, D. Zurek, A. Rest, I. Seitenzahl, B. Shappee, R. Fisher, J. Guillochon, M. Shara, A. Reiss, “Observations of SN 2015F suggest a correlation between the intrinsic luminosity of Type Ia supernovae and the shape of their light curves > 900 days after explosion,” *submitted*. [ADS](#) [arXiv](#)

P. Dave, R. Kashyap, R. Fisher, F. Timmes, D. Townsley, and C. Byrohl, “Constraining the Single-Degenerate Channel of Type Ia Supernovae with Stable Iron-Group Elements In SNR 3C 397,” *The Astrophysical Journal*, 841, 1, 2017. [ADS](#) [arXiv](#) [DOI](#)

R. Kashyap, R. Fisher, E. García-Berro, G. Aznar-Siguán, S. Ji, and P. Lorén-Aguilar, “One-Armed Spiral Instability in Double-Degenerate Post-Merger Accretion Disks,” *The Astrophysical Journal*, 840, 16, 2017. [ADS](#) [arXiv](#) [DOI](#)

Filippo Frontera

Position: Adjunct Professor of ICRANET, Contract Professor of the University of Ferrara, Associated Senior Scientist INAF-IASF Bologna

Period covered: January- December 2017



I Scientific Work

Experimental and observational X-/gamma-ray astronomy, in particular:

- a. Advanced process development for assembling a focusing Laue lens of gamma-rays;
- b. Study of a mission, THESEUS, now under evaluation by ESA (M5 call), devoted to high z GRBs, multi-messenger astronomy and monitoring of the X-ray sky for the search of new transient phenomena.
- c. Study of a space mission concept ASTENA (Advanced Surveyor of Transient Events and Nuclear Astrophysics) based on Laue lens (30-600 keV) with unprecedented sensitivity and a very large wide field ($>1\text{sr}$) broad band (1 keV-20 MeV) monitor with imaging and spectroscopy capabilities.
- d. Historical review and prospects of hard X-ray astronomy.

II Conferences and educational activities

II a. Conferences and Other External Scientific Work

- a. Attendance to the workshop on the Chinese-European mission e-XTP (extended X-ray Timing and Polarimetry) now under development, Rome, 6-8 Feb. 2017
- b. Attendance to the AHEAD meeting on Gamma-ray Astronomy, Rome, 3 March 2017.
- c. Lecture at the Academy of Sciences of Ferrara, 11 May 2017
- d. Invitation to the launch of the Chinese satellite HXMT (Hard X-ray Modulation Telescope), Jiayuguan (Inner Mongolia, China), 12-17 June 2017, with associated a workshop on e-XTP Chinese-European mission under development.
- e. Invited talk at the THESEUS workshop 2017, Naples, 5-6 October 2017
- f. Invited talk at the Symposium on "A decade of AGILE: Results, Challenges and Prospects of Gamma-Ray Astrophysics", Rome, 11-13 Dec 2017.

II b. Work With Students

yes, with

a) 1 PhD student (TaisMaiolino), EMJD-IRAP-PhD program

II c Other Teaching Duties

Course at the Master's Degree in Physics, University of Ferrara, on "Measures and Observations of Celestial X- and gamma-rays".

II d. Work With Postdocs

Yes, with 1 PostDoc: E. Virgili at the Physics and Earth Sciences Department, University of Ferrara

III. Service activities

III a. Member of the IRAP-PhD Faculty

IV. Other

none

2017 List of Publications

- Van Putten, Maurice H. P. M.; Levinson, Amir; **Frontera, Filippo**; Guidorzi, Cristiano; Amati, Lorenzo; Della Valle, Massimo, *GPU-searches for broadband extended emission in gravitational waves in nearby energetic core-collapse supernovae*, eprint arXiv:1709.04455, submitted to Space Science Reviews (2017).
- Amati, L.; O'Brien, P.; Goetz, D.; Bozzo, E.; Tenzer, C.; **Frontera, F.**; Ghirlanda, G.; Labanti, C.; Osborne, J. P.; Stratta, G.; and 202 coauthors, *The Transient High Energy Sky and Early Universe Surveyor (THESEUS)*, eprint arXiv:1710.04638, submitted to Advances in Space Research (2017).
- Cavallari, Erica; **Frontera, Filippo**, *Hard X-Ray/Soft Gamma-Ray Experiments and Missions: Overview and Prospects*, Space Science Reviews, Volume 212, Issue 1-2, pp. 429-518 (2017).
- Virgili, E.; Valsan, V.; **Frontera, F.**; Caroli, E.; Liccardo, V.; Stephen, J. B., *Expected performances of a Laue lens made with bent crystals*, J. of Astronomical Telescopes, Instruments, and Systems, 3(4), 044001 (2017). doi:10.1117/1.JATIS.3.4.044001
- Stratta, G.; Ciolfi, R.; Amati, L.; Ghirlanda, G.; Tanvir, N.; Bozzo, E.; Gotz, D.; O'Brien, P.; Frontera, F.; Osborne, J. P.; and 48 coauthors, *THESEUS: a key space mission for Multi-Messenger Astrophysics*, eprint arXiv:1712.08153, Submitted to Advances in Space Research (2017).

Chris Fryer – CV

DEGREES:

- University of Arizona, Tucson, AZ – Ph.D. in Astronomy, 1996;
- University of California at Berkeley, Berkeley, CA, Double Major, Mathematics and Astrophysics, Minor – Russian Language – B.A. 1992

Experience:

- Adjunct Professor, GWU, 2017 - present
- Adjunct Professor, UNM, 2009 - present
- Adjunct Professor, Physics Dept., Univ. of Arizona, 2003-present
- Staff Scientist, T-6 and then CCS-2, 2001- present
- Feynman Fellow, LANL, 2000-2001
- Research Associate, UCSC, 1997-2000
- Research and Teaching Assistant, University of Arizona, 1992-1996

Memberships and Awards:

- Los Alamos National Laboratory Fellow (2015)
- E.O. Lawrence Award (2014)
- Fellow of the American Physical Society (2008)
- Member of the American Astronomical Society,
- Gordon Bell Finalist (2003)
- Distinguished performance Award (2002)
- Graduate Research Prize (1995)

Other Current Activities

- Project Lead, High energy-density physics impact
- Director, Center for Theoretical Astrophysics
- Advisory Board: Institutional Computing
- Executive Board: Center for Non Linear Studies
- Executive Board: Information Science and Technology Institute
- Advisory Board: Center for Space and Earth Sciences

- Instructor, Los Alamos Community College Astronomy program

Research Interests

- Astrophysical Transients: Supernovae, Kilonovae, Gamma-ray bursts: engines, nucleosynthetic yields, emission
- Compact Remnant formation: Neutron Stars, Black Holes
- Gamma-Ray Burst Progenitors
- Gravitational Wave Science
- High Energy-Density Physics

Publication statistics and talks:

- over 200 papers published in peer-reviewed journals with over 13000 citations (many studying explosions from stellar collapse), over 400 papers total
- h-index 56 including 36 high-impact (>100 citations), 15 are first-author papers
- ~70 invited talks including several plenary talks and department colloquia.

Refereed Publications in 2017:

1. Grefenstette et al., (2017) “The Distribution of Radioactive ^{44}Ti in Cassiopeia A”, *ApJ*, 834, 19
2. Cote et al., (2017) “Advanced LIGO Constraints on Neutron Star Mergers and r-process Sites”, *ApJ*, 836, 230
3. Motl et al., (2017) “A Comparison of Grid-based and SPH Binary Mass-transfer and Merger Simulations”, *ApJS*, 229, 27
4. Lloyd-Ronning, N. & Fryer, C.L. (2017) “On the lack of a radio afterglow from some gamma-ray bursts - insight into their progenitors?”, *MNRAS*, 467, 3413
5. Kains et al. (2017) “Microlensing Constraints on the Mass of Single Stars from HST Astrometric Measurements”, *ApJ*, 843, 145
6. Kasliwal et al. (2017) “Infrared Emission from Kilonovae: The Case of the Nearby Short Hard Burst GRB 160821B”, *ApJ*, 843, L34
7. Wollaeger et al. (2017) “Light Curves and Spectra from a Unimodal Core-collapse Supernova”, *ApJ*, 845, 168
8. Arnett et al. (2017) “Pre-nebular Light Curves of SNe I”, *ApJ*, 846, 33
9. Bayless et al. (2017) “The Supernovae Analysis Application (SNAP)”, *ApJ*, 846, 101
10. Batta et al. (2017) “The Formation of Rapidly Rotating Black Holes in High-mass X-Ray Binaries”, 846, L15
11. Abbot et al. (2017) “Multi-messenger Observations of a Binary Neutron Star Merger”, *ApJ*, 848, L12

12. Soares-Santos et al. (2017) “The Electromagnetic Counterpart of the Binary Neutron Star Merger LIGO/Virgo GW170817. I. Discovery of the Optical Counterpart Using the Dark Energy Camera”, *ApJ*, 848, L16
13. Cowperthwaite et al. (2017) “The Electromagnetic Counterpart of the Binary Neutron Star Merger LIGO/Virgo GW170817. II. UV, Optical, and Near-infrared Light Curves and Comparison to Kilonova Models”, *ApJ*, 848, L17
14. Chornock et al. (2017) “The Electromagnetic Counterpart of the Binary Neutron Star Merger LIGO/Virgo GW170817. IV. Detection of Near-infrared Signatures of r-process Nucleosynthesis with Gemini-South”, *ApJ*, 848, L19
15. Tanvir et al. (2017) “The Emergence of a Lanthanide-rich Kilonova Following the Merger of Two Neutron Stars”, *ApJ*, 848, L27
16. Troja et al. (2017) “The X-ray counterpart to the gravitational-wave event GW170817”, *Nature*, 551, 71
17. Abbot et al. (2017) “A gravitational-wave standard siren measurement of the Hubble constant”, *Nature*, 551, 85
18. De la Rosa et al. (2017) “Rapidly Interpreting UV-optical Light Curve Properties Using a “Simple” Modeling Approach”, *ApJ*, 850, 133

Paolo Giommi

Position: Director of ASI Science Data Center

Period covered: 1 January – 10 November 2015



I Scientific Work

Research in multi-frequency multi-messenger astrophysics, mostly in the field of AGN and Blazars. Over the past year I have been particularly active in high-energy (100MeV-10TeV) astrophysics, correlations between blazars, neutrinos and Ultra High Energy Cosmic Rays (UHECRs)

Development of new techniques (e.g. ASDC SED tool) for the analysis of large amounts of archival data, including published results.

II Conferences and educational activities

II a Conferences and Other External Scientific Work

“2nd Latter Meeting, Rio de Janeiro . Invited talk

14th Marcel Grossman meeting – Roma . Plenary Talk

TeV Particle Astrophysics 2015 – Tokyo. Invited Plenary Talk

II c Diploma thesis supervision of Yu-Ling Chen and Carlos Brandt, Supervision of research work of Bruno Arsioli and (partly) Bernardo Fraga (CAPES post-docs)

III. Service activities Director of ASI Science Data Center

III a. Within ICRANet.

Definition and first implementation of the Brazilian Science Data Center.

2015 List of Publications

1. 2015MNRAS.446.4078K

New white dwarf stars in the Sloan Digital Sky Survey Data Release 10

Kepler, S. O.; Pelisoli, I.; Koester, D.; Ourique, G.; Kleinman, S. J.; Romero, A. D.; Nitta, A.; Eisenstein, D. J.; Costa, J. E. S.; Külebi, B.; Jordan, S.; Dufour, P.; Giommi, Paolo; Rebassa-Mansergas, Alberto

2. 2015MNRAS446L,41

A simplified view of blazars: the very high energy gamma-ray vision

Padovani, P.; Giommi, P.

3. 2015Ap&SS.357...75M

The 5th edition of the Roma-BZCAT.

Massaro, E.; Maselli, A.; Leto, C.; Marchegiani, P.; Perri, M.; Giommi, P.; Piranomonte, S.

4. [2015Sci...348..670B](#)

Boggs, S. E.; Harrison, F. A.; Miyasaka, H.; Grefenstette, B. W.; Zoglauer, A.; Fryer, C. L.; Reynolds, S. P.; Alexander, D. M.; An, H.; Barret, D.; Christensen, F. E.; Craig, W. W.; Forster, K.; Giommi, P.; Hailey, C. J.; Hornstrup, A.; Kitaguchi, T.; Koglin, J. E.; Madsen, K. K.; Mao, P. H.; Mori, K.; Perri, M.; Pivovarov, M. J.; Puccetti, S.; Rana, V.; Stern, D.; Westergaard, N. J.; Zhang, W. W.

5. [2015ApJS..218...23A](#)

*Fermi Large Area Telescope Third Source Catalog
As part of the Fermi collaboration*

6. [2015MNRAS.449.3517D](#)

Are many radio-selected BL Lacs radio quasars in disguise?
[D'Elia, V.](#); [Padovani, P.](#); [Giommi, P.](#); [Turriziani, S.](#)

7. [2015Ac&A...579A..34A](#)

1WHSP: An IR-based sample of ~ 1000 VHE γ -ray blazar candidates
[Arsioli, B.](#); [Fraga, B.](#); [Giommi, P.](#); [Padovani, P.](#); [Marrese, P. M.](#)

8. [2015ApJ...807...79H](#)

Rapid Variability of Blazar 3C 279 during Flaring States in 2013-2014 with Joint Fermi-LAT, NuSTAR, Swift, and Ground-Based Multiwavelength Observations

[Hayashida, M.](#); [Nalewajko, K.](#); [Madejski, G. M.](#); [Sikora, M.](#); [Itob, R.](#); [Ajello, M.](#); [Blandford, R. D.](#); [Buson, S.](#); [Chiang, J.](#); [Fukazawa, Y.](#); [Furniss, A. K.](#); [Urry, C. M.](#); [Hasan, I.](#); [Harrison, F. A.](#); [Alexander, D. M.](#); [Baloković, M.](#); [Barret, D.](#); [Boggs, S. E.](#); [Christensen, F. E.](#); [Craig, W. W.](#); [Forster, K.](#); [Giommi, P.](#); [Grefenstette, B.](#); [Hailey, C.](#); [Hornstrup, A.](#); [Kitaguchi, T.](#); [Koglin, J. E.](#); [Madsen, K. K.](#); [Mao, P. H.](#); [Miyasaka, H.](#); [Mori, K.](#); [Perri, M.](#); [Pivovarov, M. J.](#); [Puccetti, S.](#); [Rana, V.](#); [Stern, D.](#); [Tagliaferri, G.](#); [Westergaard, N. J.](#); [Zhang, W. W.](#); [Zoglauer, A.](#); [Gurvell, M. A.](#); [Uemura, M.](#); [Akitaya, H.](#); [Kawabata, K. S.](#); [Kawaguchi, K.](#); [Kanda, Y.](#); [Moritani, Y.](#); [Takaki, K.](#); [Ui, T.](#); [Yoshida, M.](#); [Agarwal, A.](#); [Gupta, A. C.](#)

9. [2015MNRAS.450.2404G](#)

A simplified view of blazars: contribution to the X-ray and γ -ray extragalactic backgrounds
[Giommi, P.](#); [Padovani, P.](#)

10. [2015arXiv150805894C](#)

CTA Contributions to the 34th International Cosmic Ray Conference (ICRC2015)

11. [2015ApJ...810...14A](#)

The Third Catalog of Active Galactic Nuclei Detected by the Fermi Large Area Telescope
Fermi collaboration

12. [2015arXiv150902063T](#)

Multiwavelength Evidence for Quasi-periodic Modulation in the Gamma-ray Blazar PG 1553+113
Fermi collaboration

13. [2015JHEAp...7..173G](#)

Multi-frequency, multi-messenger astrophysics with Swift. The case of blazars
[P. Giommi](#)

14. [2015MNRAS.452.1877P](#)

A simplified view of blazars: the neutrino background

Padovani, P.; Petropoulou, M.; Giommi, P.; Resconi, E.

15. [2015ApJ...812...65F](#)

First NuSTAR Observations of Mrk 501 within a Radio to TeV Multi-Instrument Campaign

NuSTAR+MAGIC+VERITAS collaborations

16. [2015arXiv151004631M](#)

NuSTAR Hard X-ray Survey of the Galactic Center Region I: Hard X-ray Morphology and Spectroscopy of the Diffuse Emission

Mori, Kaya; Hailey, Charles J.; Krivonos, Roman; Hong, Jaesub; Ponti, Gabriele; Bauer, Franz; Perez, Kerstin; Nynka, Melania; Zhang, Shuo; Tomsick, John A.; Alexander, David M.; Baganoff, Frederick K.; Barret, Didier; Barriere, Nicolas; Boggs, Steven E.; Canipe, Alicia M.; Christensen, Finn E.; Craig, William W.; Forster, Karl; Giommi, Paolo; Grefenstette, Brian W.; Grindlay, Jonathan E.; Harrison, Fiona A.; Hornstrup, Allan; Kitaguchi, Takao; Koglin, Jason E.; Luu, Vy; Madsen, Kristen K.; Mao, Peter H.; Miyasaka, Hiromasa; Perri, Matteo; Pivovarov, Michael J.; Puccetti, Simonetta; Rana, Vikram; Stern, Daniel; Westergaard, Niels J.; Zhang, William W.; Zoglauer, Andreas

17. [2015arXiv151008358K](#)

X-Ray Polarimetry with the Polarization Spectroscopic Telescope Array (PoSTAR)

Krawczynski, Henric S.; Stern, Daniel; Harrison, Fiona A.; Kislat, Fabian F.; Zajczyk, Anna; Beilicke, Matthias; Hoormann, Janie; Guo, Qingzhen; Endsley, Ryan; Ingram, Adam R.; Miyasaka, Hiromasa; Madsen, Kristin K.; Aaron, Kim M.; Aminia, Rashied; Baring, Matthew G.; Beheshti-pour, Banafsheh; Bodaghee, Arash; Booth, Jeffrey; Borden, Chester; Boettcher, Markus; Christensen, Finn E.; Coppi, Paolo S.; Cowsik, Ramanath; Davis, Shane; Dexter, Jason; Done, Chris; Dominguez, Luis A.; Ellison, Don; English, Robin J.; Fabian, Andrew C.; Falcone, Abe; Farretto, Jeffrey A.; Fernandez, Rodrigo; Giommi, Paolo; Grefenstette, Brian W.; Kara, Erin; Lee, Chung H.; Lyutikov, Maxim; Maccarone, Thomas; Matsumoto, Hironori; McKinney, Jonathan; Mibara, Tatehiro; Miller, Jon M.; Narayan, Ramesh; Natalucci, Lorenzo; Oezel, Feryal; Pivovarov, Michael J.; Prado, Steven; Psaltis, Dimitrios; Okajima, Takashi; Toma, Kenji; Zhang, William W.

18. *Proceedings of 2nd Lattes meeting*

Multi-frequency multi-messenger astrophysics with blazars at ASDC and BSDC

Paolo Giommi

Harutyunyan Vahagn

Position: PhD

Period covered: 2013-2016



I Scientific Work

My current research is dedicated of measuring SN rate as a function of environment and radio luminosity of the galaxies. I exploit data from SUDARE (Supernova Diversity And Rate Evolution) survey, which is conducted with the ESO VST telescope with the aim to measure rates of different SN type in $0 < z < 0.8$ redshift range. For this task the study being performed on two best-studied extragalactic fields, CDFS and COSMOS.

II Conferences and educational activities

II a Conferences and Other External Scientific Work

II b Work With Students

II c Diploma thesis supervision

Supervisor: Massimo Della Valle

Thesis: Supernova Diversity from Galaxy Cluster Diversity: Rates and Hints on Supernova Progenitors

II d Other Teaching Duties

II e. Work With Postdocs

III. Service activities

III a. Within ICRANet

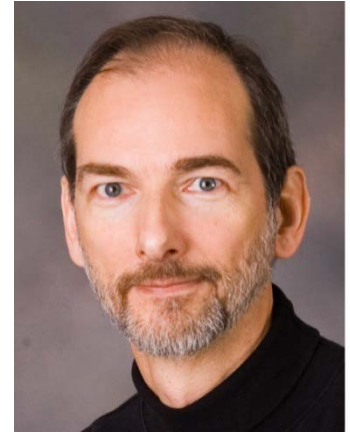
Research: We aim to analyze if at higher redshifts both type Ia and CC SN rates follow the same trend that of the local Universe. For this purpose we cross-matched the galaxy sample monitored by SUDARE with VLA catalog. The Supernova Diversity And Rate Evolution (SUDARE) is a SN survey that aims to measure the SN rates as a function of redshift, sSFR, stellar mass and radio and infrared luminosity of galaxies. The SN search is performed in two of the best-studied extragalactic fields, the CDFS and COSMOS. The cadence of observation, during the first two years of our program, is every 3 days in r band and 1 week in g, i bands to obtain multicolor light curves for photometric typing of transients. We collected 117 SNe, from which 57% are type Ia SNe To analyze if the SN rates also increase with infrared luminosity we cross-matched the SUDARE galaxy sample with MIR SWIRE catalog. In the LIRG subsample 8 SNe have been discovered. The SN Ia and CC rate measurement in radio and infrared galaxy samples is in preparation.

IV. Other

2014 List of Publication

1. V. Harutyunyan, M. T. Bottcella, E. Cappellaro, M. Della Valle, G. Pignata, L. Greggio, Supernova rates as a function of radio luminosity from SUDARE Survey (in preparation)
2. V. Harutyunyan, M. T. Bottcella, E. Cappellaro, M. Della Valle, G. Pignata, L. Greggio, SN rates in Galaxy Groups luminosity from SUDARE survey (in preparation)

Jantzen, Robert



Position: **Professor**

Period covered: **2017**

I Scientific Work

Ongoing collaboration with Donato Bini on mathematical properties of stationary spacetimes

II Conferences and educational activities

II a Conferences and Other External Scientific Work

MG14 Editing duties

II b Work With Students

II c Diploma thesis supervision

II d Other Teaching Duties

II e. Work With Postdocs

III. Service activities [*activities carried out in collaboration with ICRAANet (e.g. teaching activities, conferences etc...) and outside ICRAANet (teaching activities in your university etc...)*]

III a. Within ICRAANet

MG14 Editing duties

III b. Outside ICRAANet

IV. Other

2017 List of Publications

[145.](#) Gyroscope precession along general orbits around a Kerr black hole

D. Bini, A. Geralico and R.T. Jantzen
Phys. Rev. D 95, 124022 (2017).

[146.](#) Position determination and strong field parallax effects for photon emitters in the Schwarzschild spacetime

D. Bini, A. Geralico and R.T. Jantzen
GRG 49, 151 (2017).

- [147.](#) Proceedings of the Fourteenth Marcel Grossmann Meeting on General Relativity (2015)
M. Bianchi, R.T. Jantzen, R. Ruffini, Eds.,
World Scientific, Singapore, 2017.

Jetzer Philippe

University of Zurich, Switzerland

Position: Professor

Period covered: 2015



I. Service activities

III b. Outside ICRANet

Lecture on: “Mathematical Methods in Physics” during the Spring semester 2015 at University of Zurich

2015 List of Publication

1. “Planck view of the M82 galaxy” with V.G. Gurzadyan et al., *Astron.Astrophys.* 582 (2015) A77.
2. “Effective-one-body Hamiltonian with next-to-leading order spin-spin coupling” with Simone Balmelli, *Phys.Rev. D91* (2015) 064011.
3. “Testing General Relativity and Alternative Theories of Gravity with Space-based Atomic Clocks and Atom Interferometers” with Ruxandra Bondarescu, Andreas Schärer, Philippe Jetzer, Raymond Angélil, Prasenjit Saha, Andrew Lundgren, *EPJ Web Conf.* 95 (2015) 02002.
4. “Supermassive Black Hole Tests of General Relativity with eLISA” with Cédric Huwyler, Edward K. Porter, Philippe Jetzer, *Phys.Rev. D91* (2015) 2, 024037

Bio data

1. Date of birth: 8 January 1948

Place of birth: Tehran/Iran

Nationality: Iranian

2. Education:

Primary School: Schariat School, Tehran, 1954-1959.

High School: Rahnamaa High School, Tehran, 1959-1965.

University: University of Vienna, Ph. D. In Physics and Astronomy, 1965-1972.

3. Scientific Employment and Academic Responsibility:

INO project director, IPM, 2007-

IPM School of Astronomy, Chairman, 2007- 2011

McGill University, Department of Physics, July 2005-August 2006, on sabbatical leave.

University of Potsdam, Germany; Oct. 1995- Oct. 1996, Alexander von Humboldt Fellow.

Sharif University of Technology, Iran, Chairman, Department of physics 1983-1985, 1991-1993.

Sharif University of Technology, Iran, Professor of Physics 1989-.

Vienna University, Institute for Theoretical Physics, September 1986-October 1987, on sabbatical leave.

Sharif University of Technology, Iran, Associate Professor 1979-1989.

University of Cologne, Germany, 1978-79, Alexander von Humboldt Fellow.

Vienna University, Austria, Assistant Professor 1972-1977.

Sharif University of Technology, Faculty, 1979- Present

Abbreviated Curriculum Vitae

GRANT J. MATHEWS

October 31, 2014

ADDRESS

*Department of Physics
Center for Astrophysics
University of Notre Dame
Notre Dame, IN 46556
email: gmathews@nd.edu
off: (574) 631-6919 , FAX: (574) 631-5952*

BIRTHDATE:

October 14, 1950

PRESENT POSITION:

- Nov. 1994 - Present Professor
Department of Physics
University of Notre Dame
and
- Sept. 2000 - Present Director,
Center for Astrophysics at Notre Dame University (CANDU)
University of Notre Dame

PREVIOUS POSITIONS:

- Apr. 1993-Nov. 1994 Senior Scientist Physical Sciences & Space Technologies Directorate Physics Research Program/P-Division University of California, Lawrence Livermore National Laboratory

and

- Sept. 1992-Nov. 1994 Adjunct Professor of Physics and Astronomy University of California, Davis
- Oct. 1986-Apr. 1993 Group Leader for Astrophysics Physics Department/E-Division University of California, Lawrence Livermore National Laboratory
- Apr. 1981-Oct. 19886 Physicist Physics Department/E-Division University of California, Lawrence Livermore National Laboratory
- Nov. 1979-Apr. 1981 Senior Research Fellow California Institute of Technology, W. K. Kellogg Radiation Laboratory
- Sept. 1977- Nov. 1979 Research Associate University of California, Lawrence Berkeley Laboratory
- May-Sept. 1977 Post-Doctoral Research Associate, University of Maryland

EDUCATION:

- B.S., June 1972, Michigan State University
- Ph.D., May 1977, University of Maryland, College Park, MD Dissertation: *Reflections and Research on: I) The Nucleosynthesis of Light and Heavy Nuclei; II) A Generalized Theory of Odd-A Nuclei; III) A Study of Three Heavy-Ion Systems*

HONORS:

- Research Excellence Award of the Society of the Sigma Xi (1976)
- Assoc. Western Univ.-ERDA-Fellowship to Lawrence Berkeley Laboratory (1976)
- Visiting Scientist: California Institute of Technology (1981)
- Guest Scientist: Max Planck Institute for Astrophysics (1984)
- Distinguished Visiting Professor: Univ. of Chicago (1990)
- Outstanding Scientific Publication Award: Phys. Res. Prog., LLNL (1993)
- Fellow: American Physical Society (1994)
- Visiting Professor: National Astronomical Observatory of Japan (1994, 2000, 2001, 2005, 2007-2012)
- Center of Excellence Distinguished Lecturer, Tokyo University (2005)

CURRENT RESEARCH INTERESTS:

- **Cosmology:** Brane-world cosmology, inflation, big-bang nucleosynthesis, cosmic microwave background, primordial power spectrum, time-varying constants, dark matter and dark energy theories.
- **Theoretical NUclear Astrophysics:** Nuclear astrophysics, supernova models, thermonuclear burning and nucleosyntheses, the r-process, the s-process, galaxy formation and galactic chemical evolution, equation of state for neutron stars and supernovae
- **Astroparticle Physics:** Neutrinos in supernovae and the big bang, the QCD phase transition in the big bang and neutron stars, strange-matter stars, gamma-ray bursts, high-energy neutrino production
- **General Relativity and Relativistic Hydrodynamics:** Neutrons stars, neutron-star binaries, accreting neutron stars, accreting black holes, stars near black holes.

Recent Courses Taught

Undergraduate courses

1. Descriptive Astronomy 10140: Fall 2005, Fall 2009, 2010,2011,2012
2. Nuclear Warfare 20061: Spring 2008
3. Elementary Cosmology 171: Fall 2003, 2004, 2005
4. Physics General Lab 32220: Spring 2007
5. Introductory Physics for Students in Health Science 221: Fall 2002, Spring 2003

Graduate Courses

1. Cosmological Physics: 80204: Spring 2007, 2009
2. Mathematical Methods of Physics 70002: Fall 2006, 2007, 2008
3. Introductory Astrophysics (short course): Fall 2010,2011,2012
4. General Relativity 70050/50204: Spring 2004,2005,2006, Spring 2009,2010,2011,2012

Refereed Journal Publications *over 3800 Citations*

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Origin of Matter and Evolution of Galaxies, S. Kubono et al., eds., AIP Conference Proceedings, Volume 1484, pp. 333-338 (2012).

119. G. J. Mathews, M.-K. Cheoun, T. Kajino, M. Kusakabe and D. G. Yamazaki, "Frontiers of Big Bang Cosmology and Primordial Nucleosynthesis," in 11th International Symposium on Origin of Matter and Evolution of Galaxies, S. Kubono et al., eds., AIP Conference Proceedings, 1484, pp. 339-347 (2012).
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123. Cheoun, Myung-Ki; Ryu, C. Y.; Kajino, Toshitaka; Kusakabe, Motohiko; Mathews, Grant J. Reinvestigation of Quark Masses Variations on Big Bang Nucleosynthesis, Few-Body Systems, Volume 54, Issue 1-4, pp. 495-499 (2013).
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Invited talks and Colloquia

1. Oct. 1975 University of Maryland, Nuclear Chemistry Seminar. ***r*-Process Nucleosynthesis, Superheavy Elements, and Recent Atomic Mass Tables**
2. June 1977 California Institute of Technology, Kellogg Seminar. **Cosmic-Ray Nucleosynthesis and Galactic Chemical Evolution.**
3. Sept. 1977 University of Maryland, Nuclear Chemistry Seminar. **On the nucleosynthesis of ${}^{7,6}\text{Li}$ and the Question of a Bound or Unbound Universe.**
4. April. 1978 Granlibaken Workshop on Heavy Ion Collisions, invited talk. **A Dynamical Simulation of Heavy-Ion Collisions.**
5. June. 1978 California Institute of Technology. **A Dynamical Simulation of Heavy-Ion Collisions.**
6. March 1979 University of Virginia, Physics Department Colloquium. **Nucleon Transport During Heavy-Ion Collisions.**
7. April 1979 University of Maryland, Nuclear Chemistry Colloquium. **Nucleon Transport During Heavy-Ion Collisions.**
8. Feb. 1980 Lawrence Berkeley Laboratory, Nuclear Science Division Seminar. **Missing Matter.**
9. April 1980 Ohio State University, Physics Department Colloquium. **Angular Momentum in the Cosmic Background Radiation and the Thermodynamic History of the Early Universe.**
10. Apr. 1980 California Institute of Technology, Kellogg Seminar. **Angular Momentum in the Cosmic Background Radiation and the Thermodynamic History of the Early Universe.**
11. Dec. 1980 Oregon State University, Chemistry Department Colloquium. **Some Current Aspects on the Origin and History of the Elements.**
12. Jan. 1981 Lawrence Livermore National Laboratory, A-Division Seminar. **Origin and Evolution of the Elements.**
13. March 1981 University of Minnesota, Physics Department Colloquium. **Origin and Evolution of the Elements.**

14. May 1981 Workshop on Nuclear Astrophysics, Tegernsee, Germany. **Synthetic H-R Diagram for NGC1866.**
15. May 1981 Workshop on Nuclear Astrophysics, Tegernsee, Germany. **Systematics of r -Process Abundances in Meteoritic Isotopic Anomalies.**
16. June 1981 Lawrence Livermore National Laboratory, E-Division Seminar. **Highlights of Nuclear Astrophysics.**
17. June 1982 Lawrence Livermore National Laboratory, E-Division Seminar. **Nuclear Spallation and the Origin of Cosmic Rays.**
18. June 1982 NATO Workshop on Composition and Origin of Cosmic Rays, Erice Italy. **Complete Fragment Yields from Spallation Reactions via the Combined Time-of Flight and $\Delta - E$ Technique.**
19. June 1982 NATO Workshop on Composition and Origin of Cosmic Rays, Erice Italy. **Synthetic H-R Diagrams and Stellar Evolution.**
20. July 1982 Max Planck Institute for Physics and Astrophysics, Garching, Germany. Institute for Astrophysics Seminar, **Synthetic H-R Diagrams as a Constraint on Stellar Evolution.**
21. May 1983 Lawrence Livermore National Laboratory, Astrophysics Seminar. **Synthetic H-R Diagrams.**
22. May 1983 Workshop on Nuclear Astrophysics, Tegernsee, Germany. **Comparison between Observed and Theoretical H-R Diagrams as a Constraint on Stellar Evolution Theory.**
23. May 1983 Workshop on Nuclear Astrophysics, Tegernsee, Germany. **Large-Basis Shell Model Calculations of β -Decay Strength Functions for Applications in Nuclear Astrophysics.**
24. May 1983 Workshop on Nuclear Astrophysics, Tegernsee, Germany. **The Role of Direct Radiative Neutron Capture in the r -Process.**
25. Oct. 1983 OECD/NEA Nuclear Data Committee Specialists Meeting on Yields and Decay Data of Fission Product Nuclides, Brookhaven National Laboratory. **Applications of Fission Product Data to Problems in Stellar Nucleosynthesis.**
26. Oct. 1983 Lawrence Livermore National Laboratory, E-Division Seminar. **Some Problems in Stellar Evolution and Neutron Capture Nucleosynthesis.**

27. Nov. 1983 University of Washington, Nuclear Physics Seminar. **Some Problems in Stellar Evolution and Neutron Capture Nucleosynthesis.**
28. Jan. 1984 Lawrence Livermore National Laboratory, E-Division Seminar. **Synthetic H-R Diagrams for Young Star Clusters in the Magellanic Clouds.**
29. Apr. 1984 Lawrence Livermore National Laboratory, E-Division Seminar. **What in the World is Going on with the Sr-Rb Cosmic Clock.**
30. May 1984 University of California, Davis, Department of Applied Science Colloquium. **Nuclear Astrophysics – A New Look at the Ancient Skies.**
31. June 1984 NATO Workshop on Stellar Nucleosynthesis, Erice Italy. **Synthetic H-R Diagrams as a Constraint of Stellar Ages and Evolution.**
32. Nov. 1984 Workshop on Nuclear Shell Models, Drexel University. **Shell-Model Lanczos-Method Studies of the Gamow-Teller Strength Function in Astrophysics.**
33. Mar. 1985 Workshop on Nucleosynthesis and Its Implications on Nuclear and Particle Physics, Les Arcs, France. **Stellar Diagnostics of the s-Process.**
34. Mar. 1985 Workshop on Nucleosynthesis and Its Implications on Nuclear and Particle Physics, Les Arcs, France. **Large-Basis Shell-Model Technology in Nucleosynthesis and Cosmology.**
35. Apr. 1985 Indiana University, Joint Nuclear Physics/Astronomy Seminar. **Ages of Stars and Galaxies from Stellar Evolution and Nucleosynthesis.**
36. Apr. 1985 University of Michigan, Joint Nuclear Physics/Astronomy Seminar. **Ages of Stars and Galaxies from Stellar Evolution and Nucleosynthesis.**
37. May 1985 Conference on Nuclear Data for Basic and Applied Science, Santa Fe. **Some Nuclear Data Needs in Astrophysics.**
38. July 1985 Lawrence Livermore National Laboratory, E-Division Seminar. **A Microscopic Approach to Nuclear Strength Functions.**
39. Sept. 1985 Accelerated Radioactive Beams Workshop, Parksville, Canada. **Radioactive Ion Beam Research at LLNL.**
40. Sept. 1985 American Chemical Society Symposium on Nuclei off the Line of Stability, Chicago. **Nuclear Astrophysics Away from Stability.**

41. Feb. 1986 Washington University, St. Louis, Chemistry Department Colloquium. **In search of the Astrophysical Sites for Neutron-Capture Nucleosynthesis.**
42. July 1986 Workshop on Advances in Nuclear Astrophysics, Institut de Astrophysique, Paris. **Relativistic (3+1) Dimensional Hydrodynamic Simulations of Compact Interacting Binary Systems.**
43. July 1986 Workshop on Advances in Nuclear Astrophysics, Institut de Astrophysique, Paris. **Primordial Nucleosynthesis in Inhomogeneous Cosmologies: $\Omega = 1$ with Baryonic Dark Matter.**
44. Sept. 1987 Canadian Physical Society Invited Talk, Calgary, Canada. **Lattice Gauge Theory as a Nuclear Many-Body Problem.**
45. Dec. 1987 Symposium on Hot Nuclei, Texas A&M University. **Heavy-Ion Collisions with $A = 10^{57}$: Aspects of Nuclear Stability and the Nuclear Equation of State in Coalescing Neutron-Star Binary Systems.**
46. Mar. 1988 Institut de Astrophysique, Paris, Astrophysics Colloquium. **The Quark-Hadron Phase Transition, Baryon Diffusion, and Primordial Nucleosynthesis.**
47. Mar. 1988 Workshop on Dark Matter, Les Arcs, France. **Evolution of Heavy-Element Abundances in the Galactic Halo and Disk.**
48. Mar. 1988 Les Arcs Workshop on Dark Matter. **Evolution of Baryon Number Density Fluctuations Before, During, and After Primordial Nucleosynthesis.**
49. April 1988 Fermilab Workshop on QCD in Astrophysics. **The Quark-Hadron Phase Transition and Primordial Nucleosynthesis.**
50. Apr. 1988 Harvard-Smithsonian Center for Astrophysics, Theoretical Astrophysics Division Seminar. **The Evolution of Baryon Number Density Fluctuations from the QCD Phase Transition.**
51. Apr. 1988 Yale University, Joint Nuclear Physics/Astronomy Seminar **Hadronization of the Quark-Gluon Plasma, Primordial Nucleosynthesis of Heavy Elements and Cosmological QCD.**
52. May 1988 University of Illinois, Astrophysics Colloquium. **The Quark Hadron Phase Transition and Primordial Nucleosynthesis.**

53. June 1988 Workshop on the Primordial Lithium Abundance, Livermore, CA. **Galactic Chemical Evolution with Low and High Primordial Lithium.**
54. June 1988 Gordon Research Conference on Nuclear Physics, Tilton, NH **The Quark-Hadron Phase Transition in the Early Universe and Primordial Nucleosynthesis.**
55. June 1988 Lawrence Livermore National Laboratory, Nuclear Chemistry Division Colloquium. **Physical Chemistry for the Early Universe: from Quarks to Uranium.**
56. July 1988 Workshop on Heavy Ion Physics and Nuclear Astrophysical Problems, University of Tokyo. **Prospects for Understanding the Astrophysical r -Process.**
57. Sept. 1988 Lawrence Livermore National Laboratory, Physics Department Technical Briefing. **The Well Tempered Radioactive Ion Beam.**
58. Oct. 1988 Institute of Geophysics and Planetary Physics, Astrophysics Seminar, Lawrence Livermore National Laboratory. **Heavy Element Galactic Chemical Evolution.**
59. Nov. 1988 University of California, Davis, Department of Applied Science Colloquium. **In Search of the Astrophysical Site for the Origin of Heavy Elements.**
60. Mar. 1989 Workshop on Atomic Processes in Nuclear Explosives, Lawrence Livermore National Laboratory, Invited Talk. **Supercomputers in Quantum Chromodynamics.**
61. May 1989 Ohio State University, Nuclear Physics/Nuclear Astrophysics Seminar. **Tests of Theories of r -Process Nucleosynthesis.**
62. June 1989 University of California, San Diego, Center for Astrophysics and Space Science Seminar. **In Search of the Astrophysical Site for r -Process Nucleosynthesis.**
63. Aug. 1989 University of Notre Dame, Nuclear Seminar. **In Search of the Astrophysical Site for r -Process Nucleosynthesis.**
64. Sept. 1989 Lawrence Livermore National Laboratory, E-Division Seminar. **The Paradox of the Closure Parameter for the Universe.**

65. Oct. 1989 University of Chicago, Enrico Fermi Institute Astrophysics Seminar. **Heavy Element Nucleosynthesis and Galactic Chemical Evolution.**
66. Dec. 1989 Clemson University, Physics Department Colloquium. **Heavy Element Nucleosynthesis and Galactic Chemical Evolution.**
67. Feb. 1990 University of California, Davis, Department of Applied Science Colloquium. **The Missing Matter Problem of the Universe.**
68. Feb. 1990 University of Arizona, Theoretical Astrophysics Colloquium. **In Search of the Astrophysical Site for r-Process Nucleosynthesis.**
69. Mar. 1990 Symposium on Cosmology and Nuclear Astrophysics, Physical Society of Japan, Osaka. **Heavy-Element Nucleosynthesis.**
70. April 1990 Tokyo Metropolitan University, Cosmology and Astrophysics Colloquium. **Deviation from Periodicity in the Large Scale Distribution of Galaxies.**
71. April 1990 Tokyo Metropolitan University, Cosmology and Astrophysics Colloquium. **A Paradigm of the Dark Matter Problem and the Omega Problem.**
72. April 1990 Tokyo Metropolitan University, Cosmology and Astrophysics Colloquium. **Search for the Astrophysical Sites for Heavy Element Nucleosynthesis.**
73. April 1990 University of Tokyo, Physics Department Colloquium. **Heavy-Element Nucleosynthesis and Galactic Chemical Evolution.**
74. April 1990 Tokyo Institute of Technology, Physics Department Colloquium. **In Search of the Astrophysical Sites for Heavy Element Nucleosynthesis.**
75. April, 1990 Princeton University, Astrophysics Seminar. **Heavy Element Nucleosynthesis and the Dynamice of Galaxy Formation and Evolution**
76. April 1990 Symposium on Nuclear Astrophysics, Americal Chemical Society, Boston. **Heavy Element Galactic Chemical Evolution.**
77. April 1990 Workshop on the Science of Intense Radioactive Ion Beams, Los Alamos National Laboratory. **Prospects for Nuclear Astrophysics with Intense Radioactive Ion Beams.**
78. May 1990 University of California, San Diego, Physics Department Colloquium. **An Overview of the Dark Matter Problem and the Omega Problem.**

79. Sept. 1990 Lawrence Livermore National Laboratory, Physics Department Technical Briefing. **Elemental Nucleosynthesis and the Dynamics of Galaxy Formation and Evolution.**
80. Sept. 1990 Symposium on Primordial Nucleosynthesis and Evolution of Early Universe, University of Tokyo, Japan. **Chaotic Inflation and the Omega Problem.**
81. Oct. 1990 University of Chicago, Astrophysics Seminar. **Dynamics of Galaxy Formation and Galactic Chemical Evolution.**
82. Oct. 1990 University of Chicago, Guest Lecture Series. **Standard Big Bang Nucleosynthesis.**
83. Oct. 1990 International Symposium on Capture Gamma-Ray Spectroscopy and Related Topics, Invited Talk. **Nuclear and Astronomical Constraints on the Site for r-Process Nucleosynthesis.**
84. Oct. 1990 University of Chicago, Guest Lecture Series. **Nonstandard Big Bang Nucleosynthesis.**
85. Nov. 1990 Washington University, St. Louis, Physics Department Colloquium. **In Search of the Site for r-Process Nucleosynthesis.**
86. Nov. 1990 University of Chicago, Guest Lecture Series. **Nucleocosmochronology and Galactic Chemical Evolution.**
87. Nov. 1990 University of Illinois at Urbana, Astronomy Colloquium. **Dynamics of Galaxy Formation and Galactic Chemical Evolution.**
88. Nov. 1990 University of Chicago, Guest Lecture Series. **Thermonuclear Reaction Rates and the Phases of Stellar Evolution.**
89. Nov. 1990 University of Notre Dame, Physics Department Colloquium. **An Overview of the Inhomogeneous Big Bang: If You Don't Like the Standard Homogeneous Big Bang, You Can Lump It.**
90. Nov. 1990 Ohio State University, Physics Department Colloquium. **Chaotic Inflation and the Omega Problem.**
91. Dec. 1990 University of Chicago, Guest Lecture Series. **Neutron Capture Nucleosynthesis.**

92. Dec. 1990 Michigan State University, Joint Astronomy/Nuclear Physics Seminar. **An Overview of the Inhomogeneous Big Bang: If You Don't Like the Standard Homogeneous Big Bang, You Can Lump It.**
93. Dec. 1990 Fermilab National Accelerator Laboratory, Astrophysics Colloquium. **Chaotic Inflation and the Omega Problem.**
94. Jan. 1991 Workshop on Strong, Weak, and Electromagnetic Interactions in Nuclei, Atoms, and Astrophysics, Lawrence Livermore National Laboratory. **Exploring the Universe with the Shell Model.**
95. Jan. 1991 Institute of Geophysics and Planetary Physics Seminar, Astrophysics Seminar, Lawrence Livermore National Laboratory. **Stochastic Inflation and the Omega Problem.**
96. Apr. 1991 American Physical Society Invited Talk, Washington, D.C. **Nuclear Astrophysics Away from Stability: The Need for Radioactive Ion Beams.**
97. Sept. 1991 Clemson University, Physics Department Colloquium. **An Overview of the Inhomogeneous Big Bang: If You Don't Like the Standard Homogeneous Big Bang, You Can Lump It.**
98. Nov. 1991 Golden Gate Chemical Society, Invited Lecture, Hayward, CA. **How Did the Universe Begin and Why is it so Empty?**
99. Jan. 1992 Workshop on the Primordial Helium Abundance, Clemson University. Invited Talk, **Irregular Galaxy Evolution and the Primordial Helium Abundance.**
100. Jan. 1992 Workshop on the Primordial Helium Abundance, Clemson University. Invited Talk, **Limits to the Primordial Helium Abundance in Inhomogeneous Big Bang Models.**
101. May 1992 Workshop on the Galactic Chemical Dynamics, Clemson University. **Protogalactic Mergers and CCosmochronology.**
102. May 1992 Workshop on the Galactic Chemical Dynamics, Clemson University, Invited Talk, **Irregular Galaxy Evolution and the Primordial Helium Abundance.**
103. Jan. 1992 Workshop on the Primordial Helium Abundance, Clemson University Invited Talk, **Limits to the Primordial Helium Abundance in Inhomogeneous**

Big Bang Models.

104. June 1992 Americal Astronomical Society, Ohio State University, Invited Talk, **Formation of the Galaxy and Cosmochronology**
105. Sept. 1992 Symposium on Nuclear Physics in the Universe, Oak Ridge, Invited Talk **Origin and Evolution of r-Process Elements in the Galaxy**
106. Oct. 1992 University of Oklahoma, Physics Department Colloquium, **Galaxy Formation and Cosmochronology**
107. Oct. 1992 University of Oklahoma, Astronomy Department Seminar, **Heavy Element Synthesis in the Hot Supernova Bubble**
108. Oct. 1992 University of Chicago, Astrophysics Seminar, **Heavy Element Synthesis in the Hot Supernova Bubble**
109. Oct. 1992 California State University, Hayward, Physics Department Colloquium, **Galaxy Formation and Cosmochronology**
110. Nov. 1992 Canadian Institute for Theoretical Astrophysics, Astrophysics Colloquium, **Galaxy Formation and Cosmochronology**
111. Feb. 1993 University of Texas, McDonald Observatory, Astronomy Colloquium, **Galaxy Formation and Cosmochronology**
112. Feb. 1993 Rice University, Physics Department Colloquium, **Galaxy Formation and Cosmochronology**
113. Feb. 1993 Rice University, Astrophysics Seminar, **Heavy Element Nucleosynthesis in the Hot Supernova Bubble**
114. Feb. 1993 Rice University, Gamma-Ray Astronomy Seminar, **A Coalescing Neutron Star Model for Cosmological Gamma-Ray Bursts**
115. Mar. 1993 U. C. Berkeley, Cosmology Seminar, **Protogalactic Mergers and Cosmochronology**
116. June 1993 Third International Conference on Radioactive Nuclear Beams, Michigan State University, **New Production Mechanisms for Unstable Nuclei in Stars, Supernovae, and the Big Bang**

117. June 1993 Symposium on Weak Interactions, Nuclear Astrophysics, and Cosmology in Honor of Sam M. Austin's 60-th Birthday, Michigan State University, **Weak Interactions and Supernovae**
118. Sept. 1993 Lawrence Livermore National Laboratory, Astrophysics Seminar, **Constraining Inflation with the Cosmic Microwave Background**
119. Oct. 1993 Notre Dame University, Physics Department Colloquium, **Constraining Inflation with the Cosmic Microwave Background**
120. Oct. 1993 Notre Dame University, Nuclear Physics Seminar, **Nuclear Weak Interaction Rates in Supernovae**
121. Jan. 1994 Steward Observatory, Univ. of Arizona, Theoretical Astrophysics Seminar, **Nucleosynthesis in the Neutrino Energized Wind from Supernovae**
122. Jan. 1994 Steward Observatory, Univ. of Arizona, Departmental Colloquium, **Galaxy Formation and Cosmochronology**
123. Feb. 1994 University of California at Davis, Physics Department Colloquium **Constraining Inflation with the Cosmic Microwave Background**
124. Feb. 1994 Lake Louise Winter Institute on Particle Astrophysics and Cosmology/Joint ISAC Workshop **Weak Interactions and Heavy Element Nucleosynthesis in the Hot Supernova Bubble**
125. Feb. 1994 Rice University, Physics Department Colloquium, **Constraining Ripples in the Big Bang**
126. Feb. 1994 Rice University, Astrophysics Seminar, **Heavy Element Nucleosynthesis in the Hot Supernova Bubble**
127. Mar. 1994 Workshop on Applications of the National Ignition Facility, Lawrence Livermore National Laboratory, **Astrophysics Applications of the National Ignition Facility**
128. Mar. 1994 ACS Symposium on Novel Approaches to Nuclear Astrophysics, San Diego, CA **Creating Stars, Supernovae, and the Big Bang in the Laboratory: Nuclear Astrophysics with the Proposed National Ignition Facility**
129. Apr. 1994 Third International Workshop on Galactic Chemical Dynamics, Lawrence Livermore National Laboratory, Institute of Geophysics and Planetary Physics, **Galaxy**

Formation, MACHOS, and Cosmochronology

130. Apr. 1994 Notre Dame University Physics Department Colloquium **Weak Interactions and Supernova Dynamics**
131. Apr. 1994 Michigan State University Department of Physics and Astronomy Colloquium **Weak Interactions and Supernova Dynamics**
132. Apr. 1994 Michigan State University, Astronomy Seminar **Constraining Inflation with the Cosmic Microwave Background**
133. April 1994 National Astronomical Observatory, Japan, Theoretical Astrophysics Seminar **Weak Interactions and Supernova Dynamics**
134. May 1994 National Astronomical Observatory, Japan, Astronomy Colloquium **Galaxy Formation and Cosmochronology**
135. May 1994 University of Tokyo, Astronomy Colloquium, **Weak Interactions and Supernova Dynamics**
136. May 1994 Osaka University, Laser Physics Colloquium, **Creating Stars, Supernovae, and the Big Bang in the Laboratory: Nuclear Astrophysics with the Proposed National Ignition Facility**
137. June 1994 Institute of Nuclear Science, Tokyo, Colloquium, **Weak Interactions and Supernova Dynamics**
138. June 1994 RIKEN National Laboratory, Tokyo, Nuclear Colloquium, **Inhomogeneous Primordial Nucleosynthesis**
139. July 1994 Workshop on Nuclear and Particle Astrophysics and Cosmology for the Next Millennium, Snowmass, CO, Invited Talk, **Nonstandard Primordial Nucleosynthesis**
140. July 1994 Workshop on Nuclear and Particle Astrophysics and Cosmology for the Next Millennium, Snowmass, CO, Summary Talk, **Summary of the Future for Primordial and Stellar Nucleosynthesis**
141. Sept. 1994 Lawrence Livermore National Laboratory, Institute for Geophysics and Planetary Physics, Astrophysics Seminar, **Relativistic Binary Neutron Star Coalescence**

142. Sept. 1994 University of Oklahoma, Physics Department, Colloquium, **General Relativistic Neutron Star Coalescence**
143. Dec. 1994 Wayne State University, Physics Department, Colloquium, **Relativistic Binary Neutron Star Coalescence**
144. Jan. 1995 Ohio State University, Nuclear Physics Seminar, **Relativistic Binary Neutron Star Coalescence**
145. Apr. 1995 Workshop on Isotopic Anomalies, Clemson University, Invited Talk, **Galactic Chemical Dynamics and Cosmochronology**
146. Apr. 1995 Workshop on Isotopic Anomalies, Clemson University, Invited Talk, **Relativistic Binary Neutron Star Coalescence and Decompressing Neutron Star Matter**
147. July 1995 Workshop on Galactic Chemodynamics 4: The History of the Milky Way and it's Satellite System, Tegernsee, Invited Talk, **Galactic Chemical Dynamics and Cosmochronology**
148. Oct. 1995 Third Huntsville Workshop on Gamma Ray Bursts, Huntsville, Ala., Contributed Talk, **General Relativistic Simulation of Close Neutron Star Binaries: Implications for Cosmological Gamma-Ray Bursts**
149. Jan. 1996 Second International Workshop on Gravitational Microlensing, Orsay, France, Invited Talk, **Hot X-ray Gas and the Formation of Remnants in the Galactic Halo**
150. Apr. 1996 Univ. Illinois, Astronomy Department Colloquium, **Relativistic Binary Neutron Star Coalescence**
151. Jun. 1996 Univ. Notre Dame, Notre Dame, IN International Workshop on Nuclei in the Cosmos - IV, invited talk **Primordial Nucleosynthesis in the Next Millennium**
152. Aug. 1996 Gull Lake Conference on Nuclear Physics Near the Drip Lines, Gull Lake, MI, invited talk **The Decompression of Neutron-Star Matter**
153. Sep. 1996 International Workshop on the Identification of Dark Matter, University of Sheffield, UK **Hot Intercluster Medium and Halo Microlensing Events**
154. Sept. 1996 Oakland Univ., Rochester, MI - Physics Department Colloquium, **Hot Stars and Cold Gas: Clues to the Origin of Galaxies**

155. Oct. 1996 Indiana University, Purdue Univ., Indianapolis, Physics Department Colloquium **Instabilities in Close Neutron Star Binaries**
156. Nov. 1996 Bowling Green Univ., Ohio - Sixth Midwest Relativity Meeting Invited Talk - **Instabilities in Close Neutron Star Binaries**
157. Jan. 1997 Fermilab Theoretical Astrophysics Seminar: **Instabilities in Close Neutron Star Binaries**
158. Jan. 1997 Aspen Center for Physics, LIGO Workshop on Detection of Gravitational Radiation, invited talk, **Relativistic Hydrodynamic Results Relevant to the LIGO Detector.**
159. Feb. 1997 Univ. Arizona, Tucson, AZ, Astronomy Department Colloquium, **White Dwarfs in Galactic Halos and the Hot Intergalactic Medium**
160. Feb. 1997 Univ. Arizona, Tucson, AZ, Theoretical Astrophysics Seminar, **Instabilities in Close Neutron Star Binaries**
161. Feb. 1997 Hope College, Holland, MI, Physics Department Colloquium, **Instabilities in Close Neutron Star Binaries**
162. Mar. 1997 Third International Workshop on Gravitational Microlensing Surveys, Univ. of Notre Dame, Notre Dame, IN, Invited Talk **Halo Remnants and Galactic Chemical Dynamics**
163. May 1997 Spacetime '97, Michigan State University, E. Lansing, MI, Invited talk, **Heavy Ion Collisions with $A=10^{58}$: Methods of General Relativistic Hydrodynamics**
164. June 1997 University of North Carolina, Chapel Hill, NC, Astrophysics Colloquium, **General Relativistic Numerical Hydrodynamics For Close Neutron Star Binaries**
165. June 1997 The Eighth Marcel Grossmann Meeting on General Relativity, Givat Ram Campus, The Hebrew University, Jerusalem, Invited talk, **Relativistic Studies of Close Neutron Star Binaries**
166. June 1997 The Eighth Marcel Grossmann Meeting on General Relativity, Givat Ram Campus, The Hebrew University, Jerusalem, Invited talk, **Gamma-Ray Bursts from Neutron Star Binaries**

167. July 1997 International Workshop on the Synthesis of Light Nuclei in the Early Universe, European Centre for Theoretical Studies in Nuclear Physics and Related Areas, Trento Italy, Invited talk, **Galaxy Formation and Light Element Abundances**
168. July 1997 International Workshop on the Synthesis of Light Nuclei in the Early Universe, European Centre for Theoretical Studies in Nuclear Physics and Related Areas, Trento Italy, Invited talk, **Comments on Standard, Nonstandard and Inhomogeneous Primordial Nucleosynthesis**
169. Nov. 1997 - Workshop on the Origin of Matter and Evolution of Galaxies - Atami, Japan - Invited Talk **Development and Problems in the r-Process Scenario**
170. Nov. 1997 - Yukawa Institute of Theoretical Physics, Kyoto University, Japan - Astrophysics Colloquium, **Relativistic Hydrodynamics in Close Neutron Star Binaries**
171. Nov. 1997 - 3rd RESCUE International Symposium on Particle Cosmology, University of Tokyo, Japan, **Comments on Nonstandard Primordial Nucleosynthesis**
172. Nov. 1997 - International Symposium on Neutron Stars and Pulsars: Thirty Years after the Discovery, Rikkyo University, Tokyo, Japan - Invited Talk, **General Relativistic Hydrodynamics of Close Neutron Star Binaries**
173. Jan. 1998 - Winter Workshop on Universal Star Formation, Aspen Center for Physics, Aspen, CO, - Overview Talk - **Importance of Star Formation in Cosmology**
174. Mar. 1998 - International Workshop on Japan Hadron Facility Science, High Energy Accelerator Research Organization (KEK), Tsukuba, Japan, - Key-Note Address - **Nuclear Astrophysics with Radioactive Ion Beams**
175. Mar. 1998 - East Coast Nickle and Dime Gravity Meeting, Syracuse University, Syracuse NY - Invited Talk - **Relativistic Hydrodynamics in Close Binary Systems: Analysis of Neutron Star Collapse**
176. July 1998 - Workshop on Applications of High Precision Gamma-Ray Spectroscopy, Univ. of Notre Dame, July 1-3, 1998, **Current Topics in Gamma-Ray Astrophysics.**
177. July 1998 - 5th International Workshop on Nuclei in the Cosmos, Volos, Greece, July 6-12, 1998, **Models for Gamma-Ray Bursts from Binary Neutron Stars**
178. Sept. 1998 - University of Michigan, Astrophysics Seminar, **Relativistic Hydrodynamics for Neutron Star Binaries**

179. Oct. 5, 1998 - Astronomy Dept. Colloquium, Indiana University, **Where have all the Baryons Gone? An analysis of white dwarfs in the galactic halo and the hot intergalactic medium**
180. Oct. 6, 1998 - Astronomy Seminar, Indiana University, **General Relativistic Hydrodynamics for Binary Neutron Stars**
181. Nov. 20, 1998 - Invited Talk, "Frontiers in Nuclear Astrophysics" workshop, Argonne National Laboratory, **Towards Understanding the r-Process: A Summary of recent progress in supernova r-process models and computations of nuclear properties far from stability**
182. Nov. 8, 1998 - Invited Talk, Area Meeting on Variable Stars, Astronomy Department, Michigan State University, **Stellar Evolution and Variability of Betelgeuse**
183. Dec. 11, 1998 - Invited Talk, Workshop on LiBeB, Cosmic Rays and Gamma-Ray Line Astronomy, Institut d'Astrophysique de Paris, CNRS, Paris, France, **Formation and Evolution of the Halo : Implications for Light Elements**
184. June 28, 1999 - Invited Lecture, 11th Summer School in Nuclear Physics in Celebration of Maria Mayer and the 50th Anniversary of the Shell Model, University of California, San Diego - **Unsolved Mysteries in Post Main-Sequence Stellar Evolution**
185. June 30, 1999 - Invited Lecture, 11th Summer School in Nuclear Physics in Celebration of Maria Mayer and the 50th Anniversary of the Shell Model, University of California, San Diego - **Neutron Star Hydrodynamics**
186. July 1, 1999 - Invited Lecture, 11th Summer School in Nuclear Physics in Celebration of Maria Mayer and the 50th Anniversary of the Shell Model, University of California, San Diego - **Supernovae and Gamma-Ray Bursts"**
187. Nov. 12, 1999 - Invited Talk, The 9th Midwest Relativity Meeting, Univ. Illinois at Urbana- Champaign - **Revised Relativistic Hydrodynamical Model for Neutron-Star Binaries**
188. Jan. 21, 2000 Invited Talk, OMEG 2000 Conference on the Origin of Matter and the Evolution of Galaxies, Tokyo University, Center for Nuclear Science - **Neutron Star Mysteries**
189. Mar. 6 2000 Invited Talk, Shell Model 2000 International Symposium, **Shell Model Studies near the A=130 r-Process Waiting Point**, RIKEN (Institute of Physical and Chemical Research), Tokyo

190. Mar. 10 2000 Astronomy Colloquium, National Astronomical Observatory, Tokyo, Japan, **Studies of Compact Objects: White Dwarfs, Neutron Stars and Black Holes**
191. Mar. 28 2000 Astrophysics Seminar, Yukawa Institute for Theoretical Physics, Kyoto University, Kyoto Japan **Reconstruction of Stellar Orbits around SgrA*: Possibilities for Testing General Relativity**
192. Mar. 30 2000 Invited Talk, Japanese Physical Society Meeting, Kinki University, Osaka Japan, **Unsolved Mysteries of Post-Main Sequence Evolution**
193. Apr. 25 2000 Astrophysics Seminar, Hanyang University, Seoul Korea, **Some Mysteries of Compact Objects: White Dwarfs, Neutron Stars and Black Holes**
194. Apr. 27, 2000 Joint Seminar, Asia-Pacific Center for Theoretical Astrophysics & Korean Institute for Advances Study, Seoul Korea, **Energetic Gamma Rays from Gamma-Ray Bursts.**
195. Apr. 28, 2000 Invited Talk, Korean Physical Society Meeting, Seoul, Korea, **Exploring the Black Hole in the Galactic Center.**
196. May 18, 2000 Astronomy Department Seminar, Tokyo University, Tokyo, Japan, **Sub-TeV Gamma Rays from Gamma-Ray Bursts: An Interpretation**
197. June 7, 2000 Theoretical Astrophysics Seminar, National Astronomical Observatory, Tokyo Japan, **New Evidence for Neutrino Degeneracy in the Early Universe.**
198. Sept. 5 2000 Overview Talk, TOURS 2000, Symposium on Nuclear Physics IV, Tours France, **Cosmology, Cosmic Chemical Evolution and the Age Problem.**
199. Sept. 5 2000 Invited Talk, International Conference on Cosmic Evolution, Institut d'Astrophysique, Paris France, **Cosmology, Cosmic Chemical Evolution and the Age Problem.**
200. Nov. 16 2000 Invited Talk, International Conference on Cosmic Evolution, Institut d'Astrophysique, Paris France, **New Insights into Neutron-Capture Nucleosynthesis.**
201. Jan. 30 2001 Invited Talk, Workshop on Nuclear Incompressibility, University of Notre Dame, **Nuclear Incompressibility, Supernovae and the r-Process.**
202. Feb. 1 2001 Colloquium, Department of Physics and Astronomy, University of Oklahoma, **New evidence for Neutrino Degeneracy ing the Early Universe.**

203. Feb. 17 2001 Invited Talk, Workshop on Frontiers in Nuclear Astrophysics February 16-17, 2001 Argonne National Laboratory **New Paradigms for Neutron-Capture Nucleosynthesis.**
204. Apr. 29 2001 Invited Talk, American Physical Society Meeting, Washington, DC, **New Paradigms for Nucleosynthesis in the Early Universe and First Generation of Stars.**
205. Jun. 27 2001 Invited Talk, Korean Workshop on Numerical Methods for Astrophysical Flows, Pusan University, Korea **Relativistic Hydrodynamic Simulations of Quasiperiodic Oscillations.**
206. July 2, 2001 Astronomy Seminar, Tokyo University, Japan, **Relativistic Hydrodynamic Simulations of Quasiperiodic Oscillations.**
207. July 4, 2001 Theoretical Astrophysics Seminar, National Astronomical Observatory, Japan, **Relativistic Hydrodynamic Simulations of Quasiperiodic Oscillations.**
208. Oct. 10, 2001 Theoretical Astrophysics Seminar, University of Illinois, **Cosmic Quintessence, k-Essence and Primordial Nucleosynthesis.**
209. Oct. 15, 2001 Theoretical Astrophysics Seminar, Fermilab, Illinois, **New Paradigms for Nucleosynthesis in the Early Universe and First Generation of Stars.**
210. Oct. 15, 2001 Astrophysics Seminar, Fermilab, Illinois, **The Case for Neutrino Degeneracy.**
211. Oct. 19 2001 Invited Talk, First Joint Meeting of the Nuclear Physicists of the American and Japanese Physical Societies, Maui, HI **New into Neutron-Capture Nucleosynthesis.**
212. Oct. 20 2001 Invited Talk, Mini-symposium on High Temperature Nucleosynthesis, First Joint Meeting of the Nuclear Physicists of the American and Japanese Physical Societies, Maui, HI **High-Temperature Nucleosynthesis on the Neutron-Rich Side of Stability.**
213. Nov. 18 2001 Astronomy Colloquium, State Univ. of New York, Stonybrook, NY **New Paradigms for Nucleosynthesis in the Early Universe and First Generation of Stars.**
214. July 8, 2002 Invited Overview Talk, The 7th International Symposium on Nuclei in

- the Cosmos, Fuji-Yoshida, Japan, **New Paradigms in Primordial Nucleosynthesis.**
215. July 16, 2002 Invited Overview Talk, Workshop on Light-to-Heavy Elements in Cosmology and Galactic Evolution, National Astronomical Observatory, Tokyo Japan, **Cosmology and Nuclear Astrophysics.**
 216. Sep. 4, 2002 Physics Department Colloquium, University of Notre Dame, **New Paradigms for the Big Bang: Dark Energy and the Fifth Dimension.**
 217. Oct. 7, 2002 Invited Talk, Workshop of the Joint Institute of Nuclear Astrophysics, Gull Lake, MI, **New Insights into the Nature and Origin of the r-Process.**
 218. Jan. 10, 2003 Astrophysics Seminar, Institute of Geophysics and Planetary Physics, Lawrence Livermore National Laboratory, Livermore, CA **Cosmological Confronts the Fifth Dimension: Constraints on Dark Energy and Dark Radiation.**
 219. Jan. 21, 2003 Astrophysics Seminar, Univ. of Notre Dame, **Cosmology Confronts the fifth dimension: A deeper look at dark radiation, dark energy and dark matter.**
 220. Feb. 8, 2003 Invited Talk, Carnegie Observatories Centennial Symposium IV, Origin and Evolution of the Elements, Pasadena, CA, **An Update on the Hot Supernova Bubble r-Process: Roles of MHD and Neutrino Oscillation.**
 221. Mar. 14, 2003 Cosmology Forum, Dept. of Physics, Univ. Illinois, **Cosmology Confronts the fifth dimension: A deeper look at dark radiation, dark energy and dark matter.**
 222. Mar. 20, 2003 SUGRA 20, International Workshop, **Cosmological Evidence for Decaying Dark Matter in Brane-World Cosmolog.**
 223. May 8, 2003 KIAS-KAIST Joint Workshop on Physics Beyond the Standard Model, Korean Institute for Advancement of Science, Seoul, Korea, **Observational Constraints on Brane-World Cosmology: Evidence for the 5th Dimensions.**
 224. May 18, 2003 Invited Talk: Great Lakes Cosmology Workshop, Univ. of Michigan, Center for Theoretical Physics, **Dark Energy, Dark Radiation, and Disappearing Dark Matter in Randall-Sundrum Cosmology.**
 225. July 22, 2003 Invited Talk: Tenth Marcell Grossmann Meeting on General Relativity, CBPF-IRCA, Rio de Janeiro, Brazil, **Relativistic Compression of Neutron Stars and White Dwarfs.**

226. July 23, 2003 Invited Talk: Tenth Marcell Grossmann Meeting on General Relativity, CBPF-IRCA, Rio de Janeiro, Brazil, **Disappearing Dark Matter in brane-world cosmology: New Limits on noncompact extra dimensions.**
227. Nov. 17, 2003 Invited Overview Talk: Workshop on Origin of Matter and Evolution of Galaxies (OMEG03); RIKEN, Saitama Japan, **Origin and Evolution of Galaxies in Brane-World Cosmology: The Quest for the Fifth Dimension.**
228. Jan. 8, 2004 Invited Talk: First Argonne/MSU/INT RIA Workshop: The r-process: the astrophysical origin of the heavy elements and related Rare Isotope Accelerator Physics, Institute of Nuclear Theory, Univ. Wash., Seattle, WA, **An update on the Hot Bubble r-Process.**
229. Jan. 16, 2004 Invited Talk: Workshop on Studies of Dark Energy and Cosmology with X-Ray Surveys, Greenbelt, MD, **X-ray Probes of the Fifth Dimension: Disappearing Dark Matter and Brane-World Cosmology.**
230. Feb. 2, 2004 Joint High Energy Physics/Astrophysics Seminar, University of Michigan Center for Theoretical Physics, Ann Arbor, MI, **White-Dwarf/Black-Hole Collisions: A New Mechanism for Type I Supernovae—.**
231. Feb. 3, 2004 Astrophysics Seminar, University of Notre Dame, "White-Dwarf/Black-Hole Collisions: A New Mechanism for Type I Supernovae"
232. April. 6, 2004 Astrophysics Seminar, University of Minnesota, School of Physics & Astronomy, **Black Holes and White Dwarfs: A New Paradigm for Type I Supernova.**
233. May 13, 2004 Invited Talk, The Dark Side of the Universe Workshop, Michigan Center for Theoretical Physics, University of Michigan, Ann Arbor, MI, **Dark Radiation and Dark Matter - A View into the Fifth Dimension.**
234. July 17, 2004 Invited Talk, Workshop on Supernova Theory and Nucleosynthesis, University of Washington, Seattle WA, **STAN and the Giant Supernova Bubble.**
235. July 21, 2004 Invited Talk, Nuclei in the Cosmos VIII Vancouver, BC Canada, **Galactic Chemical Evolution, AGB Stars, and the Apparent Variation of the Fine-Structure Constant.**
236. Aug. 9, 2004 Invited Talk, 5th Recontres du Vietnam on Particle Physics and Astrophysics: New Views on the Universe, Hanoi, Vietnam, **Primordial Nucleosynthesis in the New Cosmology.**

237. Aug. 31, 2004 Astrophysics Seminar, Center for Astrophysics, University of Notre Dame, **Resonant Particle Creation during Inflation, Hunting Plank-Mass Particles in the CMB and Lyman- α Forrest.**
238. Sept. 18, 2004 Invited talk, COSMO-04 International Workshop on Particle Physics and the Early Universe, Canadian Institute for Theoretical Physics, University of Toronto, Toronto Canada, **Resonant Particle Creation during Inflation, Hunting Plank-Mass Particles in the CMB and Lyman- α Forrest.**
239. Oct. 19, 2004 Cosmology Seminar, Institute for Theoretical Physics, Univ. Minnesota, **Resonant Particle Creation during Inflation, Hunting Plank-Mass Particles in the CMB and Lyman- α Forrest**
240. Nov. 15, 2004 Omnibus Lecture Series on Particle Astrophysics and Cosmology National Astronomical Observatory of Japan, Mitaka, Tokyo, Japan, **The Search for the Parallel Universes and Extra Dimensions.**
241. Nov. 16, 2004 Omnibus Lecture Series on Particle Astrophysics and Cosmology National Astronomical Observatory of Japan, Mitaka, Tokyo, Japan, **Big Bang Nucleosynthesis in the New Cosmology.**
242. Nov. 17, 2004 Omnibus Lecture Series on Particle Astrophysics and Cosmology National Astronomical Observatory of Japan, Mitaka, Tokyo, Japan, "An update on core-collapse Supernovae and r-Process Nucleosynthesis."
243. Nov. 18, 2004 Omnibus Lecture Series on Particle Astrophysics and Cosmology National Astronomical Observatory of Japan, Mitaka, Tokyo, Japan, "White Dwarfs in Binaries and Type I Supernovae."
244. Nov. 19, 2004 Astronomy Colloquium, National Astronomical Observatory Mitaka, Tokyo, Japan, "Resonant Particle Creation during Inflation - Hunting Plank-Mass Particles in the CMB and Lyman- α Forrest."
245. Dec. 3, 2004 Colloquium, Physics Department, Florida Atlantic University, Boca Raton, FL, "The Cosmological Search for Parallel Universes and Extra Dimensions."
246. Jan. 19, 2005 Astrophysics Seminar, Center for Astrophysics, University of Notre Dame, "An update on Core Collapse Supernovae and r -Process Nucleosynthesis."
247. Jan. 28, 2005 Invited Overview Talk, Joint Institute on Nuclear Astrophysics Workshop, Univ. of Notre Dame, " r -Process Nucleosynthesis in the Hot Supernova Bubble: Where Do We Stand and Where Do We Go from Here?"

248. Mar. 9, 2005 Invited Talk, Workshop on the Nuclear Shell Model, Astrophysics, and Condensed-Matter Physics, RIKEN, Center for Nuclear Science, Wako, Japan, "Recent Progress in Core-Collapse Supernova Explosion Models and r-Process Nucleosynthesis"
249. June 16, 2005 Colloquium: Center for Theoretical Physics, Institute of Physics, Hanoi University, Vietnam, The Cosmological Search for Parallel Universes and Extra Dimensions
250. June 17, 2005 Colloquium: Vietnamese Academy of Science and Technology, Institute of Physics and Electronics, Hanoi, Vietnam, An Introduction to Cosmology, Dark Matter and Dark Energy
251. June 29, 2005 Tokyo University Center of Excellence Distinguished Lecture Series on Particle Cosmology, Supernova Explosions and Nucleosynthesis: Part I: Introduction to Cosmology, Dark Matter and Dark Energy
252. June 29, 2005 Tokyo University Center of Excellence Distinguished Lecture Series on Particle Cosmology, Supernova Explosions and Nucleosynthesis: Part II: The Beginning: various views on inflation, the multiverse, and the pre-big bang
253. June 30, 2005 Tokyo University Center of Excellence Distinguished Lecture Series on Particle Cosmology, Supernova Explosions and Nucleosynthesis: Part III: The Cosmological Search for Extra Dimensions and Parallel Universes
254. June 30, 2005 Tokyo University Center of Excellence Distinguished Lecture Series on Particle Cosmology, Supernova Explosions and Nucleosynthesis: Part IV: The First Elements: Primordial nucleosynthesis and early galactic chemical evolutions
255. June 30, 2005 Tokyo University Center of Excellence Distinguished Lecture Series on Particle Cosmology, Supernova Explosions and Nucleosynthesis: Part V: An Introduction to Relativistic Hydrodynamics
256. July 1, 2005 Tokyo University Center of Excellence Distinguished Lecture Series on Particle Cosmology, Supernova Explosions and Nucleosynthesis: Part VI: An Update on Core-Collapse Supernovae and r-Process Nucleosynthesis
257. July 1, 2005 Tokyo University Center of Excellence Distinguished Lecture Series on Particle Cosmology, Supernova Explosions and Nucleosynthesis: **Part VII: White Dwarfs, Neutron Stars, and Type I Supernovae.**
258. July 7, 2005 Astronomy Department Colloquium, Tokyo University **An update on core-collapse Supernovae and r-Process Nucleosynthesis.**

259. Aug. 30, 2005 Astrophysics Seminar CANDU; Center for Astrophysics, University of Notre Dame **The Beginning: various views on inflation, the multiverse, and the pre-big bang.**
260. Oct. 29, 2005 Invited Talk: Indiana University Cyclotron Facility: Mini-symposium in honor of Vic Viola: Celebration of a Career, **Keeping up with V^2 : Exploding Stars, Melting cyclotrons, Phantom gamma rays, and the Search for more Lithium.**
261. Mar. 3, 2006 Physics Department Colloquium: Florida Atlantic University, **Alternative Views of Dark Energy and Dark Matter.**
262. Mar. 10, 2006 Invited talk: SENFU06 Shell Model Workshop, Tokyo University, **Nuclear Physics Needs in the Supernova Bubble r-process: Where do we stand and where do we go from here?.**
263. May 19, 2006 Invited talk: Workshop on Fundamental Astro-Particle Physics, Center for Cosmology and Astroparticle Physics, The Ohio State University, **Non-Standard Big Bang Nucleosynthesis.**
264. May 27, 2006 Invited Talk: Workshop on External Correlations of the CMB and Cosmology, Fermilab, Batavia, IL **Constraints on Resonant Particle Production and Primordial Magnetic Fields from the CMB and LSS on Small Angular Scales.**
265. June 29, 2006 Invited Talk: International Symposium on Nuclear Astrophysics - Nuclei in the Cosmos - IX, CERN, Geneva, Switzerland, **Early Star Formation, Nucleosynthesis, and Chemical Evolution in Proto-Galactic Clouds.**
266. July 24, 2006 Invited Talk: Eleventh Marcel Grossmann Meeting on General Relativity, Freie Universitt Berlin, **Evidence for White Dwarfs with Strange Matter Cores.**
267. July 25, 2006 Invited Talk: Eleventh Marcel Grossmann Meeting on General Relativity, Freie Universitt Berlin, **Relativistic Hydrodynamic Simulations of Multiple Orbits for Close Neutron Star Binaries.**
268. July 26, 2006 Invited Talk: Eleventh Marcel Grossmann Meeting on General Relativity, Freie Universitt Berlin, **Dark Energy and Decaying Dark Matter.**
269. July 27, 2006 Invited Talk: Eleventh Marcel Grossmann Meeting on General Relativity, Freie Universitt Berlin, **An Axisymmetric Object-Based Search for a Flat Compact Dimension.**

270. July 28, 2006 Invited Talk: Eleventh Marcel Grossmann Meeting on General Relativity, Freie Universitt Berlin, **Constraints on Accelerating Brane Cosmology with Exchange between the Bulk and Brane**
271. Aug. 3, 2006 Astrophysics Seminar: Mahidol University, Bangkok, Thailand, **The First Elements: Primordial Nucleosynthesis and Early Galactic Chemical Evolution.**
272. Aug. 4, 2006 Physics Department Colloquium: Mahidol University, Bangkok, Thailand, **A Journey to the Center of the Galaxy: A Giant Black Hole, Lost Matter, and Exploding Stars.**
273. Aug. 9, 2006 Invited Talk: Symposium on Challenges in Particle Astrophysics, 6th Rencontres du Vietnam, Hanoi, **Unified Approaches to Dark Matter and Dark Energy.**
274. Aug. 14, 2006 Invited Lecture: Summer School on Astrophysics, Hanoi University of Education, **Introduction to Cosmology, Dark Matter and Dark Energy.**
275. Aug. 15, 2006 Invited Lecture: Summer School on Astrophysics, Hanoi University of Education, **Evidence and Interpretation of Dark Matter and Dark Energy**
276. Aug. 16, 2006 Invited Lecture: Summer School on Astrophysics, Hanoi University of Education, **Birth of the Universe: Various Views on Inflation, the Multiverse, and the Pre-Big Bang**
277. Aug. 17, 2006 Invited Lecture: Summer School on Astrophysics, Hanoi University of Education, **The Cosmological Search for Extra Dimensions and Parallel Universes.**
278. Aug. 18, 2006 Invited Lecture: Summer School on Astrophysics, Hanoi University of Education, **The First Elements: Primordial nucleosynthesis and Early Galactic Chemical Evolution.**
279. Aug. 18, 2006 Invited Lecture: Summer School on Astrophysics, Hanoi University of Education, **An Introduction to Relativistic Hydrodynamics.**
280. Aug. 19, 2006 Invited Lecture: Summer School on Astrophysics, Hanoi University of Education, **An Update on Supernovae and Early Galactic Nucleosynthesis.**
281. Sept. 9, 2006 Astrophysics Seminar: University of Notre Dame **Alternative Approaches to Dark Matter and Dark Energy.**

282. Sept. 20, 2006 Seminar: National Superconducting Cyclotron Laboratory Seminar: Michigan State University, **The First Elements: Primordial Nucleosynthesis and Early Galactic Chemical Evolution.**
283. Nov. 18, 2006 Invited talk: MIDwest General Relativity Meeting MWRM16: Washington University, St. Louis, **General Relativistic Alternatives for Dark Matter and Dark Energy.**
284. Feb. 7, 2007 FAUST Seminar, Physics Department, Florida Atlantic University, **Update on Core-Collapse Supernovae and r-Process Nucleosynthesis in the Neutrino Energized Bubble.**
285. Feb. 9, 2007 Physics Department Colloquium, Florida Atlantic University, **A Journey to the Center of the Galaxy: A Giant Black Hole, Lost Matter, and Exploding Stars.**
286. Apr. 16, 2007 Invited talk, American Physical Society Meeting, Jacksonville, FL, **Nuclear Astrophysics and Supernova Core Collapse**, on behalf of James R. Wilson, recipient of the 2005 Bethe Prize for nuclear Astrophysics.
287. Apr. 23, 2007 Physics Department Colloquium, Western Michigan University, **Alternative Approaches to Dark Matter and Dark Energy.**
288. May 21, 2007 Invited Talk: Workshop on experimental opportunities for nuclear astrophysics at the Frankfurt neutron source of the Stern-Gerlach-Zentrum - The FRANZ Neutron Source, **Some Perspectives on Neutron-Capture Nucleosynthesis in the s-Process.**
289. May 22, 2007 Invited Talk: 19th Recontres de Blois, Chateau Royal de Blois, Blois, France, **Stellar Evolution and Nucleosynthesis in 3D.**
290. June 8, 2007 Plenary Talk: 23rd International Conference on Nuclear Physics, Tokyo International Forum, Japan, **Recent Developments in Nuclear Astrophysics.**
291. June 11, 2007 Invited Talk, Workshop on Frontiers and Perspectives of Nuclear and Hadron Physics, Tokyo Institute of Technology, **Frontiers in Nuclear Astrophysics .**
292. Aug. 29, 2007 Invited Talk, Nuclear Astrophysics Workshop, National Ignition Facility, Lawrence Livermore National Laboratory, **Pair Annihilation in the Early Universe.**

293. Oct. 16, 2007 Seminar: Center for Astrophysics, University of Notre Dame, **New Frontiers in Nuclear Astrophysics**.
294. Nov. 13, 2007 Invited Talk: 2007 International Conference on Cosmology and Particle Physics, National Taiwan University, Taipei, Taiwan, **Alternative Views on Dark Matter and Dark Energy**
295. Dec. 4, 2007 Key Note Address: 10th International Symposium on the Origin of Matter and Evolution of Galaxies, OMEG07, **Big Bang Cosmology**.
296. Jan. 3, 2008 Astrophysics Seminar, Physics Department, Hanoi University of Education, Hanoi, Vietnam, **Frontiers in Stellar Astrophysics**
297. Jan. 7, 2008 Physics Department Colloquium, Hanoi University of Education, Hanoi, Vietnam, **Big Bang Cosmology**
298. Mar. 13, 2008 Invited Talk, , Workshop on r-Process nucleosynthesis and Quantum Beams, Tsukuba University, Tsukuba, JAPAN **Supernova Explosions and Nucleosynthesis**
299. Mar. 28, 2008 Plenary Talk, 12th Annual Symposium on Computational Science and Engineering (12th ANSCSE), Ubon Rajathanee University, Thailand, **3D simulations of stellar evolution and supernovae: Current challenges and progress**.
300. May 22, 2008 Chemistry/Physics Department Colloquium, Kasetsart University Bangkok, Thailand, **Big Bang Cosmology and the Birth of the Universe**
301. May 31,, 2008 Invited Talk, Workshop on Big Bang Nucleosynthesis and Particle Physics, Perimeter Institute for Theoretical Physics, University O Waterloo, Waterloo, Ontario, Canada, **Alternative Unifying Views on Dark Matter and Dark Energy**.
302. Sept. 2, 2008 Astrophysics Seminar, Dept. Physics, Univ. Notre Dame, **Key Questions in Big Bang Cosmology and Primordial Nucleosynthesis**.
303. Sept. 27, 2008 Colloquium, Chinese Institute for Atomic Energy, Beijing China, **Alternative Unifying Views on Dark Matter and Dark Energy**.
304. Sept. 26, 2008 Invited Talk, Workshop on Alternative Approaches to Gravity, Institute on High Energy Physics, Beijing, China, , **Some Alternative Unifying Views on Dark Matter and Dark Energy**.

305. Sept. 27, 2008 Nuclear Physics Seminar, Chinese Institute for Atomic Energy, Beijing China, **Key Questions in Big Bang Cosmology and Primordial Nucleosynthesis.**
306. Sept. 28, 2008 Invited Talk, TeV Particle Astrophysics Workshop, IHEP, Beijing, **High Energy Neutrinos via Heavy-Meson Synchrotron Emission in Strong Magnetic Fields**
307. Oct. 24, 2008, Invited Talk, 18th Midwest Meeting on Relativity, Jordan Hall, Univ. Notre Dame, **Some Alternative Unifying Approaches to Dark Matter and Dark Energy.**
308. Jan. 4, 2009 College of Science Special Colloquium, Hanoi University of Education, Hanoi, Vietnam, **What and When was the Christmas Star: An investigation of the astrophysics and history of the star of Bethlehem**
309. Feb. 13, 2009 Physics Department Colloquium, Florida Atlantic University, Boca Raton, FL, **Key Issues in Big Bang Cosmology.**
310. Mar. 9, 2009 Invited Talk, Workshop on the r-Process, Tsukuba University, Tsukuba, Japan **Nuclear Physics in Cosmology and Astrophysics.**
311. Mar. 26, 2009 Invited Talk, 13th Annual Symposium on Computational Science and Engineering (13th ANSCSE), Kasetsart University, Thailand, **Computational Challenges and Progress in Cosmology.**
312. June 1, 2009 Invited talk, International Conference on Cosmological Magnetic Fields MonteVerit, Ascona, Switzerland, **Constraints on the Primordial Magnetic Field and Neutrino Mass from the CMB Polarization and Power Spectra.**
313. July 13, 2009 Invited talk, 12th Marcel Grossman meeting on General Relativity, Paris, France, **High Energy Neutrinos via Heavy-Meson Synchrotron Emission in Strong Magnetic Fields.**
314. July 13, 2009 Invited talk, 12th Marcel Grossman meeting on General Relativity, Paris, France, **Some Alternative Unifying Models for Dark Energy and Dark Matter.**
315. July 15, 2009 Invited talk, 12th Marcel Grossman meeting on General Relativity, Paris, France, **Evidence for a Primordial Magnetic Field from the CMB Polarization and Power Spectra.**

316. July 16, 2009 Invited talk, 12th Marcel Grossman meeting on General Relativity, Paris, France, **Effects of Structure Formation on the Apparent Expansion Rate of the Universe: A Preliminary Estimate Based upon N-Body Simulations.**
317. Sept. 8, 2009 Astrophysics Seminar, Dept. Physics, Univ. Notre Dame, **Evidence for a Primordial Magnetic Field in the Cosmic Microwave Background and Large Scale Structure.**
318. Nov. 10, 2009 Invited talk, Dark Stars Workshop, Univ. Michigan, Ann Arbor **Current challenges and progress in 3D simulations of stellar evolution and supernovae.**
319. Jan. 26, 2010 Invited Talk, Workshop on New Frontiers in QCD 2010 - Exotic Hadron Systems and Dense Matter, Yukawa Institute for Theoretical Physics, Kyoto, Japan **Astrophysical Consequences of QCD Matter in White Dwarfs and Supernova Collapse.**
320. Jan. 28, 2010 Invited Overview Talk, Workshop on New Frontiers in QCD 2010 - Exotic Hadron Systems and Dense Matter, Yukawa Institute for Theoretical Physics, Kyoto, Japan **The Physics of Supernovae and Proto-Neutron Stars.**
321. March 9, 2010 Invited Talk, 10th International Symposium on Origin of Matter and Evolution of Galaxies, RCNP, Osaka University **Magnetic Domain Instability and the Equation of State for Magnetars: A new mechanism for SGRs.**
322. June 4, 2010 Invited Talk, Xenia Cosmic Chemical Evolution Workshop, St. Michaels, MD **Big Bang Nucleosynthesis and Early Star Formation.**
323. June 26, 2010 Invited Talk, Nuclear Astrophysics Workshop, Tokyo University, Koshiba Hall, **Overview of Nuclear Physics in Explosive Nucleosynthesis.**
324. Sept. 7, 2010 Astrophysics Seminar, University of Notre Dame, Dept. of Physics **New Insight into Photonuclear Reactions and Explosive Nucleosynthesis.**
325. Jan. 6, 2011 Invited Talk, French Japanese Symposium on Nuclear Structure Problems, Nishina Hall, RIKEN, Wako, Japan **New Insight into Photonuclear Reactions and Explosive Nucleosynthesis.**
326. Jan. 12, 2011 Astrophysics Seminar, International Christian University, Tokyo, Japan **Origin and Evolution of Structure and Nucleosynthesis for Galaxies in the Local Group**

327. Mar. 8, 2011 Astrophysics Seminar, University of Notre Dame, Dept. of Physics, **Origin and Evolution of Structure and Nucleosynthesis for Galaxies in the Local Group**
328. Aug. 30, 2011 Astrophysics Seminar, University of Notre Dame, Dept. of Physics, **Evidence for an inverted neutrino hierarchy from neutrino nucleosynthesis in core collapse supernovae, meteorites and new measurements of the θ_{13} neutrino mixing angle**
329. June 17, 2011 Colloquium, National Astronomical Observatory of Japan, Mitaka, Tokyo, **Formation and Evolution of Galactic Streaming Flows in Local-Group Like Systems**
330. Sept. 9, 2011 Seminar, Kalamazoo Astronomical Society, Kalamazoo, MI, **The Birth of the Universe**
331. Oct. 19, 2011 Colloquium, Physics Department, Florida Atlantic University Boca Raton, FL, **Formation and Evolution of Galactic Streaming Flows in Local-Group Like Systems**
332. Nov. 3, 2011 Invited Talk, 3rd Subaru International Conference "GALACTIC ARCHAEOLOGY" Nov. 1-4, Shuzenji, Japan, **Origin and Evolution of Structure and Nucleosynthesis for Galaxies in the Local Group**
333. Nov. 17, 2011 Invited Talk, 11th International Symposium on Origin of Matter and Evolution of Galaxies, Nov. 14-17, 2011, RIKEN, Wako, Saitama, Japan, **Frontiers of Big Bang Cosmology and Primordial Nucleosynthesis**
334. Nov. 18, 2011 Invited Talk, 5th meeting of OMEG Institute: OMEG5-I, Nov. 18, 2011, NAOJ, Mitaka, Tokyo, **New Frontiers in Nuclear and Particle Astrophysics: Time varying quarks MHD Jets, and the Neutrino Mass Hierarchy**
335. Nov. 23, 2011 Invited Lecture I, IAU-Vietnam Workshop on Astronomy and Astrophysics, Ho Chi Minh City, November 21-25, 2011, **Space-time, Cosmology, Dark Matter and Dark Energy**
336. Nov. 23, 2011 Invited Lecture II, IAU-Vietnam Workshop on Astronomy and Astrophysics, Ho Chi Minh City, November 21-25, 2011, **The Beginning: various views on the pre-big bang, the multiverse, inflation, and the early universe**
337. Nov. 23, 2011 Invited Lecture III, IAU-Vietnam Workshop on Astronomy and Astrophysics, Ho Chi Minh City, November 21-25, 2011, **Formation and Evolution**

of Large Scale Structure and Local-Group Like Systems

- 338. April 11, 2012 Physics Department Colloquium, University of Notre Dame, Notre Dame, IN, **The Search for a Primordial Magnetic Field in the Cosmic Microwave Background and Large Scale Structure**
- 339. August 3, 2012 Invited Talk, APCTP mini-Workshop on Nuclear Physics and Nuclear Astrophysics, August 1 - 4, Dogae Campus, Kangwon National University, Kangwon-do, Korea, **Frontiers of Big Bang Cosmology and Primordial Nucleosynthesis**
- 340. August 21, 2012 Astrophysics Seminar , University of Notre Dame, Notre Dame, IN, **Constraints on Time Varying Constants and other Exotic Physics from Big Bang Nucleosynthesis**
- 341. Oct. 11, 2012 Invited Talk, International International Symposium on Exotic Nuclear Structure from Nucleons, Koshiba Hall, University of Tokyo, Tokyo, Japan, **Updates on the nuclear equation of state for core-collapse supernovae and proto-neutron stars: Effects of 3-body forces, QCD, and magnetic fields**
- 342. Oct. 17, 2012 Invited Talk, International Workshop on Element Genesis and Cosmic Chemical Evolution: the r-process perspective, Nishina Hall, RIKEN, Wako, Japan, **New Frontiers in Supernova Neutrino Physics: Collapsar MHD Jets and the r-Process; the ν - Process and the Neutrino Mass Hierarchy**
- 343. July 9, 2013 Invited Lecture Series on Cosmology and Astrophysics, Tokyo University, Koshiba Hall, Tokyo, Japan, **1. Introduction to Cosmology and Relativity**
- 344. July 9, 2013 Invited Lecture Series on Cosmology and Astrophysics, Tokyo University, Koshiba Hall, Tokyo, Japan, **2. Birth of the Universe/cosmic phase transitions, inflation, multiverse, bulk flow**
- 345. July 10, 2013 Invited Lecture Series on Cosmology and Astrophysics, Tokyo University, Koshiba Hall, Tokyo, Japan, **3. Dark Matter and Dark Energy**
- 346. July 10, 2013 Invited Lecture Series on Cosmology and Astrophysics, Tokyo University, Koshiba Hall, Tokyo, Japan, **4. Big Bang Nucleosynthesis**
- 347. July 11, 2013 Invited Lecture Series on Cosmology and Astrophysics, Tokyo University, Koshiba Hall, Tokyo, Japan, **5. Cosmic microwave background**
- 348. July 11, 2013 Invited Lecture Series on Cosmology and Astrophysics, Tokyo University, Koshiba Hall, Tokyo, Japan, **6. Astrophysical hydrodynamics, and large**

scale structure, galaxy formation and galactic chemical evolution

- 349. July 12, 2013 Invited Lecture Series on Cosmology and Astrophysics, Tokyo University, Koshiba Hall, Tokyo, Japan, **7. Stellar evolution and nucleosynthesis**
- 350. July 12, 2013 Invited Lecture Series on Cosmology and Astrophysics, Tokyo University, Koshiba Hall, Tokyo, Japan, **8. Supernovae and remnants**
- 351. Sept. 6, 2013 Invited Talk, Workshop on Nuclear and Particle Physics, Kyushu University, Fukuoka, Japan, **Exploring the world of parallel universes and extra dimension**
- 352. Sept. 18, 2013 Invited Lecture, The VII European Summer School on Experimental Nuclear Astrophysics, Santa Tecla, Sicily, Italy, **Primordial Nucleosynthesis: A Cosmological Point of View - Part I - Background**
- 353. Sept. 19, 2013 Invited Lecture, The VII European Summer School on Experimental Nuclear Astrophysics, Santa Tecla, Sicily, Italy, **Primordial Nucleosynthesis: A Cosmological Point of View - Part II - Frontier**
- 354. Sept. 25, 2013 Invited Talk , HaPHY 2013-09: Rare Isotopes and Nuclear Astrophysics (RIaNA) Workshop, Asian Pacific Center for Theoretical Physics, Pohang, S. Korea, **Key Issues regarding the physics of neutrinos and nucleosynthesis in core-collapse neutrinos - Part I- Supernova Explosion Mechanism**
- 355. Sept. 26, 2013 Invited Talk , HaPHY 2013-09: Rare Isotopes and Nuclear Astrophysics (RIaNA) Workshop, Asian Pacific Center for Theoretical Physics, Pohang, S. Korea, **Key Issues regarding the physics of neutrinos and nucleosynthesis in core-collapse neutrinos - Part II- Supernova Nucleosynthesis**
- 356. Oct. 8, 2013 Astronomy Colloquium, Tokyo University, Tokyo, Japan, **The case for Dark Flow: Observational evidence for and against cosmic flow, quantum entanglement and parallel universes**
- 357. Oct. 15, 2013 Astrophysics Seminar, University of Notre Dame, Notre Dame, IN **The case for Dark Flow: Observational evidence for and against cosmic flow, quantum entanglement and parallel universes**
- 358. Oct. 27, 2013 Invited Talk , American Physical Society Meeting, Division of Nuclear Physics, Newport News, VA **Key Issues regarding the physics of neutrinos and nucleosynthesis in core-collapse neutrinos**

359. Nov. 14, 2013 Invited Talk, International Workshop on Nuclear equation of state with strangeness , RIKEN, Wako, Japan, **A density functional equation of state for supernova collapse: Effects of 3-body forces, hadrons and the transition to quark gluon plasma**
360. Nov. 15, 2013 Astronomy Colloquium, National Astronomical Observatory of Japan Asian Winter School 2013, Mitaka, Tokyo, Japan, **The case for Dark Flow: Observational evidence for and against cosmic flow, quantum entanglement and parallel universes**
361. Nov. 20, 2013 Key-note Speaker, The 12th International Symposium on Origin of Matter and Evolution of Galaxies (OMEG12), Tsukuba, Japan, **Observational evidence for and against cosmic flow, quantum entanglement and parallel universes**
362. Dec. 9, 2013 Invited Talk, The 27th Texas Symposium on Relativistic Astrophysics, Dallas, TX, **Key Issues regarding the physics of neutrinos and nucleosynthesis in core-collapse neutrinos**
363. Feb. 21, 2014 Invited Talk, Workshop on Neutrinos and Nuclear Astrophysics, Nihon University, Tokyo, Japan, **Flowing neutrinos in supernovae and the cosmos**
364. April 2, 2014 Physics Colloquium, Hanoi National UNiversity of Education, Hanoi, Vietnam **The case for Dark Flow: Observational evidence for and against cosmic flow, quantum entanglement and parallel universes**
365. April 28, 2014 Physics Colloquium, Seminar: Hanoi University of Science and Technology, Hanoi, Vietnam **Key Issues in Big Bang Nucleosynthesis**
366. April 28, 2014 Physics Colloquium, Seminar: Hanoi University of Science and Technology, Hanoi, Vietnam **Big Bang Nucleosynthesis as a probe of new cosmologies**
367. July 3, 2014 Invited Talk, 1st Scientific ICRANet Meeting in Armenia: Black Holes: the largest energy sources in the Universe, Yerevan (Armenia) *Black Hole Formation, Neutrinos and Nucleosynthesis*

Curriculum Vitae

-short version-

Marco Merafina

- Born in Rome (Italy) on May 29, 1959
- Graduated in Physics at University of Rome “La Sapienza” on January 30, 1986
- Researcher at Physics Department -University of Rome “La Sapienza” 1992-
- Member of the Executive Committee of Physics Department 1995-1999
- Member of Academic Board of University of Rome “La Sapienza” for *macroarea 1* (Mathematics, Physics, Chemistry, Geology and Information Science) 2006-2009
- Member of Administration Board of University of Rome “La Sapienza” 2002-2006, 2009-2013-
- Member of Board of Faculty of PhD in Astronomia e Astrofisica (University of Rome “La Sapienza”) 2006-2013
- Member of Board of Faculty of the International PhD in Astronomy, Astrophysics and Space Science; PhD supervisor and tutoring 2011-
- Member of Direction Board of AURIS (Associazione Università, Ricerca, Innovazione e Società 2007-
- Frascati National Laboratories -INFN- associate 2015-

Scientific activity

- Author of more than 40 international publications
- Referee for the journals: ApJ, MNRAS, A&A, ApSS
- Member of Board of Referees of the Journal "Scienze e Ricerche" 2015-

Research Topics

I. Equilibrium and dynamical stability of selfgravitating systems

Study of compact objects like relativistic stellar clusters, as possible progenitors of supermassive black holes observed at the inner regions of active galactic nuclei. Study of the equilibrium configurations and analysis of dynamical and thermodynamical stability for models of stellar clusters with anisotropy in velocity distribution of stars.

II. Galactic halos and dark matter

Study of semidegenerate particles systems (Fermions) in gravitational equilibrium as a possible description for galactic halos, considerable in cosmological problem of dark matter. Generalization to semidegenerate distributions with cutoff energy in phase space in presence of visible mass. Study of selfgravitating equilibrium configurations in presence of anisotropy in velocity distribution of particles.

Research development on the effects of the presence of dark energy on large scale selfgravitating structures.

III. Thermodynamic treatment of astrophysical systems

Study of thermodynamical instabilities connected to the evolution of selfgravitating systems strongly influenced by relaxation processes like globular clusters. Development of a model describing the evolution of a globular cluster to the onset of gravothermal catastrophe, starting from a new statistical approach which defines a different formalism of the various thermodynamical ensembles, out of the framework of Boltzmanian theory, by using techniques based on effective potentials applied to distribution function.

Main International Meetings

- Marcel Grossmann Meeting on General Relativity (Roma 1985, Perth 1988, Kyoto 1991, Stanford 1994, Jerusalem 1997, Rio de Janeiro 2003, Paris 2009, Stockholm 2012, Rome 2015 -chair-)
- International Symposium on Cosmology and Relativistic Astrophysics, Tartu (Estonia) 1988
- Workshop on Dynamics of Globular Clusters, Berkeley (USA) 1992
- XI S.Cruz Summer Workshop on Globular Clusters, S.Cruz (USA) 1992
- Workshop “The Universe of Gamow: Original Ideas in Astrophysics and Cosmology”, invited talk, Odessa (Ucraina) 1999
- Workshop “4-th Gamow International Conference”, invited talk, Odessa (Ucraina) 2009
- Workshop “The astrophysics with the ongoing and future experiment: space-based experiments, ground-based experiments”, invited talk, Palermo 2013
- Workshop “The Unquiet Universe”, chair, Cefalù 2014
- Conference “Modelling and Observing Dense Stellar System (MODEST 15-S)”, Kobe (Japan) 2015
- Conference “COSMIC-LAB: Star Clusters as Cosmic Laboratories for Astrophysics, Dynamics and Fundamental Physics (MODEST 16)”, Bologna 2016
- Workshop “Frontier Research in Astrophysics - II”, invited talk, Mondello 2016
- Workshop “Stellar aggregates over mass and spatial scales”, Bad Honnef (Germany) 2016

Teaching Activity at Physics Department – University of Rome "La Sapienza"

- Laboratory of Physics (CL Chemistry) 1999-2004
- Laboratory of Mechanics 2002-2007 (CL Physics) 2002-2007
- Laboratory of Advanced Calculus (CL Astronomy and Astrophysics) 2007-2009
- Selfgravitating Systems (CL Astronomy and Astrophysics) 2005-
- Dynamics of Stellar Systems (CL Astronomy and Astrophysics) 2005-2006, 2011-

Mirabel Félix

Present Position:

Conseiller Scientifique au CEA-France &
Investigador Superior CONICET-Argentina

Adjunct Professor of the ICRANet Faculty



Past positions:

- ☐ Representative and Head of the Office of Science in Chile of the European Southern Observatories
- ☐ Directeur de Recherches. Commissariat à l'Energie Atomique et aux Energies Alternatives. France
- ☐ Researcher "Superior" of the National Research Council. Argentina
- ☐ Professor (Associate - Full). Univ. of Puerto Rico, USA
- ☐ Guggenheim Fellow. California Institute of Technology. USA
- ☐ Associate Researcher. University of Maryland. USA
- ☐ Post-doctoral Researcher. University of Manchester. UK
- ☐ Fellow of the National Research Council. Argentina

Distinctions:

- ☐ Doctor Honoris Causa. University of Barcelona (2004). [Discurso de Investidura](#). ([Reduced version](#) in English published by the French Academy of Sciences)
- ☐ Rossi Prize of the High Energy Division. American Astronomical Society (1996).
- ☐ Grand Prix Deslandres. French National Academy of Sciences (2011).
- ☐ Houssay Prize for the Trajectory in Science and Technology. Ministry of Science and Technology of Argentina (2011).
- ☐ National Award in Physics. French Commission for Atomic & Alternative Energies (1995).
- ☐ Prix Konex 2013. One of the five most productive argentine scientists in Physics and Astronomy during the last decade.
- ☐ Consecration Prize. National Academy of Exact Sciences, Physical and Natural Sciences of Argentina (2010).
- ☐ Guggenheim Foundation Fellow. California Institute of Technology (1989).
- ☐ Productivity Awards. National Science Foundation-EPSCOR (USA) (1988 and 1989).
- ☐ Member of the National Academy of Exact Sciences, Physical and Natural Sciences of Argentina (2011).
- ☐ Member of the World Academy of Sciences (TWAS) - for the Advancement of Science in developing countries (2015)

I Scientific Work

Lead the discoveries of **Microquasars**, the **Apparent Superluminous Motions in the Galaxy**, and initiated the multiwavelength ground base research that lead to the discovery of **Luminous Infrared Galaxies** and **Tidal Dwarf Galaxies**.

Current areas of research:

- ☐ High Energy Astrophysics
- ☐ Extragalactic Astronomy
- ☐ Cosmology

II Conferences and educational activities

II a Conferences and Other External Scientific Work

About 6 per year

II b Work With Students

Animate science discussions at IAFE-Argentina and CEA-France

II c Diploma thesis supervision

Co-direct the thesis of Vanesa Douna on the Role of High Energy Sources in Cosmic Evolution

II d Other Teaching Duties

Several

II e. Work With Postdocs

Several

III. Service activities [*activities carried out in collaboration with ICRANet (e.g. teaching activities, conferences etc...) and outside ICRANet (teaching activities in your university etc...)*]

None until 15 November 2015

III a. Within ICRANet

III b. Outside ICRANet

IV. Other

2015 List of Publication

Publications:

- ☐ 612 (325 in refereed journals) with more than 16.100 citations
- ☐ Index h = 56 (Based on SAO/NASA Astrophysics Data System)

In 2015:

- **Metallicity dependence of high-mass X-ray binary populations**

V. M. Douna^{1;2}, L. J. Pellizza³, I. F. Mirabel^{1;4}, and S. E. Pedrosa¹

A&A 579, A44 (2015)

- Jet-induced star formation by a microquasar

Authors: [I. F. Mirabel](#), [S. Chaty](#), [L.F. Rodriguez](#), [M. Sauvage](#)

Proceedings of the IAU Symposium No. 313: 'Extragalactic jets from every angle', Galapagos, Ecuador, 15-19 September 2014, F. Massaro, C. C. Cheung, E. Lopez, and A. Siemiginowska (Eds.), Cambridge University Press

- CTA Contributions to the 34th International Cosmic Ray Conference (ICRC2015)

[2015arXiv150805894C](#)

Surname Name **NICOLAI, Hermann**

Photo



Position: Director of MPI for Gravitational Physics, Golm, Germany
Period covered: since 1997

I Scientific Work

Relativistic Quantum Field Theory, General Relativity, Unification of fundamental Interactions

II Conferences and educational activities

II a Conferences and Other External Scientific Work

II b Work With Students

s. publication [2] and

On fundamental domains and volumes of hyperbolic Coxeter-Weyl groups
Philipp Fleig, Michael Köhn, Hermann Nicolai
Letters in Math. Physics 100 (2012) 261
AEI-2011-012
e-Print: arXiv:1103.3175 [math.RT]

II c Diploma thesis supervision

II d Other Teaching Duties

II e. Work With Postdocs

III. Service activities

III a. Within ICRANet

III b. Outside ICRANet

Honorary Professor, Humboldt University Berlin, since 22.04.1999

Honorary Professor, Hannover University, since 01.06.2005

Member of the Governing Board of the School of Theoretical Physics, Dublin Institute for Advanced Studies, Dublin, Ireland, since 01.07.2005

Editor-in-Chief of the journal "General Relativity and Gravitation", 01.01.2006 – 31.12.2011

Member (representative of the Max Planck Society) of the Conseil d' Administration of the Institute des Hautes Etudes Scientifiques (I.H.E.S.), Bures-sur-Yvette, France

Member of the International Advisory Board of the International Solvay Institutes for Physics and Chemistry, Brussels, Belgium

Member of the External Advisors Committee of the Theory Unit at CERN, Switzerland, since 01.09.2011

IV. Other

Einstein Medal 2010, awarded by the Albert Einstein Society Bern, Switzerland

Gay-Lussac-Humboldt Award 2012, German-French Science Award

2013 List of Publication

- [1] (B-L) symmetry vs. neutrino seesaw
Adam Latosinski (Warsaw U.), Krzysztof A. Meissner (Warsaw U. & Potsdam, Max Planck Inst.),
Hermann Nicolai (Potsdam, Max Planck Inst.). 2013.
Published in **Eur.Phys.J. C73 (2013) 2336**

- [2] The DeWitt Equation in Quantum Field Theory
Parikshit Dutta, Krzysztof A. Meissner, Hermann Nicolai. Mar 14, 2013. 26 pp.
AEI-2013-159
e-Print: **arXiv:1303.3497 [hep-th]**

- [3] Testing the non-linear flux ansatz for maximal supergravity
Hadi Godazgar, Mahdi Godazgar, Hermann Nicolai. Mar 5, 2013. 23 pp.
DOI: 10.1103/PhysRevD.87.085038
e-Print: **arXiv:1303.1013 [hep-th]**

- [4] Deformations of gauged SO(8) supergravity and supergravity in eleven dimensions
Bernard de Wit, Hermann Nicolai. Feb 25, 2013. 29 pp.
NIKHEF-2013-003, ITP-UU-13-03, AEI-2013-048
e-Print: **arXiv:1302.6219 [hep-th]** |

- [5] Quantum Gravity: the view from particle physics
Hermann Nicolai. Jan 2013.
Conference: C12-06-25.1
e-Print: **arXiv:1301.5481 [gr-qc]**

Pelster Axel

Position: Priv.-Doz. Dr. Axel Pelster, Adjunct Professor of ICRANET
Faculty



2014 List of publication

C. Gruber and A. Pelster:

A Theory of Finite-Temperature Bose-Einstein Condensates in Neutron Stars ;

European Physical Journal D 68, 341/1-21 (2014)

arXiv:1403.3812

Tsvi Piran- Curriculum Vitae

A. Academic Background

Bs.c. Physics, Cum Laude, Tel Aviv University, 1970.

Ms.c. Geophysics and Planetary Sciences, Magna Cum Laude, Tel Aviv University, 1972.

Ph.D. Physics, The Hebrew University, 1976 (Advisors: Jacob Shaham and Joseph Katz)

B. Employment

Present Appointment:

2004:- Schwarzmans Chair, The Hebrew University

2013:- Head I-Core Inter-University center of excellence in Astrophysics

Previous appointments:

2005-2009: Dean, Hebrew University Business School

1986-2004: Professor, The Hebrew University.

1983-1986: Associate Professor, The Hebrew University.

1981-1983: Senior Lecturer, The Hebrew University.

1981-1988: Long term Member, The Institute for Advanced Studies, Princeton NJ.

1979-1981: Member, The Institute for Advanced Studies, Princeton NJ.

1979-1979: Assistant Professor, University of Texas at Austin.

1977-1979: Postdoctoral Fellow, University of Texas at Austin.

1976-1977: Postdoctoral fellow, Oxford University.

C. Long Term Visiting Positions:

2004-2005: Distinguished Moore Scholar, Caltech.

1998-1999: Visiting Professor (Physics) Columbia University.

1998-1999: Visiting Professor (Physics) New York University.

1990-1993: Visiting Professor (Astronomy) Harvard University.

D. Selected Additional Appointments:

- Co-Director Jerusalem Winter school for Theoretical Physics, 2006.
- PI ISF center of Excellence in High Energy Astrophysics 2003-2011
- Member, Steering Committee, Israel Space Agency, 1999-2005.
- Co-Director Jerusalem Winter school for Theoretical Physics, 2000.
- Chairman, Organizing Committee, VIII Marcel Grossmann meeting, Jerusalem, 1997.
- Coordinator, Jerusalem Winter School for Theoretical Physics 1983-1992.
- Member of the Scientific Organizing Committee Texas Symposium on Relativistic Astrophysics: Texas, 2013, Rio, 2012, Sydney 2006, Stanford 2004, Florence 2002, Texas 2000, Paris 1998, Chicago 1996, Jerusalem 1984,
- Member of the International Organizing Committee: Marcel Grossmann meeting on Relativity and Gravitation: Rome, 2015, Stockholm 2012, Paris 2009, Berlin 2006, Rio 2003, Rome 2000, Kyoto 1991, Perth 1998

E. Editorial Boards:

- Editorial advisory Board, Nature Communications, 2009 - 2016
- Editorial board: J. Cosmology and AstroParticle Physics, 2003 -.
- Editorial board: International Journal of Physics D, 1991-2012
- Editorial board: Classical and Quantum Gravity, 1989-1994.
- Editorial board: Nuovo Cimento B., 1986-2004.

F. Awards and Honors:

- ERC Advanced Research Grant, 2016.
- Lagrange Award (Lagrange Institute Paris), 2014
- Copernicus visiting professor (University of Ferrara), 2013
- Bohdan Paczyński Lecture (Copernicus center, Warsaw) 2013
- ERC Advanced Research Grant, 2009.
- Highly Cited (250 most cited scientists) in Space Science, 2005
- Distinguished Moore Scholarship, Caltech, 2004.
- Freund Prize for best scientific popular article in Hebrew, 2000.
- Gravity Research Foundation (USA) awards: 2000 (II prize), 1998 (II prize), 1997 (III prize), 1996 (IV prize), 1992 (V prize), 1990 (III prize), 1987 (V prize).
- Mifal Hapais Award for best Phd thesis, 1976.

G . Publications and Citations

- More than 450 publications, 11 edited books, 2 popular books in Hebrew
- More than 26,5 [source: NASA/ADS] citations
- H index = 81 [Source: NASA/ADS]
- “Highly Cited in Space Science” – [Thomson Reuters ISI]

Pisani Giovanni Battista

Position: Post-Doc Researcher at Sapienza University of Rome, Rome, Italy and ICRANet, Pescara, Italy

Period covered: 1st April 2015 – Today



I Scientific Work

Gamma Ray Bursts (GRBs) are among the most puzzling astronomical objects since their first detection by the Vela satellites in the late 1960s. GRBs are flashes in gamma-rays observed in distant galaxies. They can last from milliseconds to several minutes with an isotropic energy released up to the order of one solar mass. This peculiarity makes them the most powerful events ever observed in the Universe. A variety of models have been developed to theoretically explain the observational properties of GRBs.

My PhD research project includes the reduction and analysis of GRBs data from different satellites, such as Batse, Swift or Fermi. I investigate GRBs observations within the fireshell model scenario, which predicts that GRBs originate from an optically thick e^+e^- plasma at thermal equilibrium created by vacuum polarization during the formation of a Black Hole.

My attention is focused on GRBs associated with Supernovae (SN). Since the first discovery of this association (GRB 980425 - SN1998wt), various mechanisms have been proposed to explain it. Recently Prof. Ruffini and his collaborators have proposed the Induced Gravitational Collapse (IGC) occurring in a particular class of binary systems as progenitors for the GRB-SN sources having a released isotropic energy above 10^{52} ergs. We refer to such phenomena as Binary-driven HyperNovae (BdHNe). Together with them we are further developing the BdHN paradigm and enlarging the sample of BdHN candidates. One of the most exciting outcomes of this work is the possibility to consider this class of BdHN events as a standard candle. If confirmed, this result could provide new independent challenges on the current cosmological model back to 600 millions years only after the Big Bang.

During my current Post-Doc research project, basing on my Ph.D. thesis results, I am focusing on building a complete sample of BdHNe looking at redshifts larger than $z \sim 1$, in order to drastically enlarge our current sample and to confirm that the standard candle hypothesis holds at larger cosmological distances. My recent analysis on a complete sample of 161 BdHNe, observed by the Swift satellite up to the end of 2015, points to a non-spherical emission of the late X-ray of BdHNe which is supposedly generated by the young SN remnant. This result is in agreement with the observations of non-spherical SN remnants.

II Conferences and educational activities

II a Conferences and Other External Scientific Work

- 1) “Erasmus Mundus School”, Nice, France, 5th - 17th September, 2011;
- 2) “IRAP Erasmus Mundus Workshop”, Les Houches, France, 2nd - 6th October, 2011;
- 3) “Third Galileo-Xu Guangqi” meeting, Beijing, China, 11th- 15th October, 2011;
- 4) “Fermi/Swift GRB 2012 Conference”, Munich, Germany, 7th – 11th May, 2012;
- 5) “Erasmus Mundus School”, Nice, France, 4th – 8th June, 2012;
- 6) “13th Marcel Grossmann Meeting”, Stockholm, Sweden, 1st - 7th July, 2012;
- 7) “Erasmus Mundus School”, Nice, France, 3rd – 19th September, 2012;
- 8) III National Congress “Lampi su Napoli”, Naples, Italy, 20th - 22nd September, 2012;
- 9) “The Current Issues on Relativistic Astrophysics”, 5th - 6th October, 2012, Seoul, South Korea;
- 10) “7th Huntsville GRB Symposium”, Nashville TN, USA, 14th – 18th April, 2013;
- 11) “2nd Bego Rencontres”, Nice, France, 16th – 31st May, 2013;
- 12) “2013 yearly ICRANet Scientific Meeting on Relativistic Astrophysics”, Pescara, Italy, 3rd – 21th June, 2013;
- 13) “1st URCA Meeting on Relativistic Astrophysics”, Rio de Janeiro, Brasil, 24th – 29th June, 2013;
- 14) “13th Italian-Korean Symposium on Relativistic Astrophysics”, Seoul, South Korea, 15th – 19th July, 2013;
- 15) “Erasmus Mundus School”, Nice, France, 3rd – 20th September, 2013;
- 16) “27th Texas Meeting on Relativistic Astrophysics”, Dallas TX, USA, 8th - 13th, December 2013;
- 17) “Erasmus Mundus School”, Nice, France, 23rd - 27th February, 2014;
- 18) “Erasmus Mundus School”, Les Houches, France, 11th - 16th May, 2014;
- 19) “1st Scientific ICRANet Meeting in Armenia”, Yerevan, Armenia, 30th June - 4th July, 2014.
- 20) “3rd Bego Rencontres”, Nice, France, 8th – 19th September, 2014;
- 21) “Swift: 10 Years of Discovery”, Rome, Italy, 2nd – 5th December, 2015;
- 22) “2nd Cesar Lattes Meeting”, Rio de Janeiro, Brazil, 10th – 20th April, 2015;
- 23) “The XIV Marcel Grossmann Meeting”, Rome, Italy, 13th – 17th July, 2015;
- 24) “The 14th Italian-Korean Symposium on Relativistic Astrophysics”, Pescara, Italy, 20th – 24th July, 2015;
- 25) “4th Bego Rencontres”, Nice, France, 30th May – 3rd June, 2016;
- 26) “Supernovae, Hypernovae, and Binary-driven HyperNovae: an Adriatic Workshop”, Pescara, Italy, 20th – 27th June, 2016;

II b Work With Students

Co-tutoring of Erasmus Mundus Ph.D. Students: Milos Kovacevic and Daria Primorac.

II c Diploma thesis supervision

II d Other Teaching Duties

II e. Work With Postdocs

III. Service activities [*activities carried out in collaboration with ICRANet (e.g. teaching activities, conferences etc...) and outside ICRANet (teaching activities in your university etc...)*]

III a. Within ICRANet

Teaching activities for international Ph.D. Schools organized by ICRANet. List of schools and lectures:

1) “Erasmus Mundus School”, Nice, France, 4th – 8th June, 2012;

Lecture: A new interpretation for the disguised short GRB 060614; G. B. Pisani, R. Ruffini, C.L. Bianco, L. Izzo, J. A. Rueda, M. Muccino, A. V. Penacchioni.

2) “Erasmus Mundus School”, Nice, France, 3rd – 19th September, 2012;

Lecture: The class of “disguised” short GRBs within the fireshell model and the particular case of GRB 060614; G. B. Pisani, R. Ruffini, C.L. Bianco, L. Izzo, M. Muccino, A. V. Penacchioni;

3) “2nd Bego Rencontres”, Nice, France, 16th – 31st May, 2013;

Lecture: A new subclass of energetic GRB-SN sources: The IGC GRB-SN family; G. B. Pisani, R. Ruffini, C.L. Bianco, L. Izzo, M. Muccino, A. V. Penacchioni, J. A. Rueda.

4) “Erasmus Mundus School”, Nice, France, 3rd – 20th September, 2013;

Lecture: A new subclass of energetic GRB-SN sources: The IGC GRB-SN family; G. B. Pisani, R. Ruffini, C.L. Bianco, L. Izzo, M. Muccino, A. V. Penacchioni, J. A. Rueda.

5) “Erasmus Mundus School”, Nice, France, 23rd - 27th February, 2014;

Lecture 1: GRBs-SNe within the Induced Gravitational Collapse model; G. B. Pisani, R. Ruffini, C.L. Bianco, M. Enderli, L. Izzo, M. Kovacevic, M. Muccino, A. V. Penacchioni, J. A. Rueda, Y. Wang;

Lecture 2: The role of the High Energy in short and long GRBs; G. B. Pisani, R. Ruffini, C.L. Bianco, M. Enderli, L. Izzo, M. Kovacevic, M. Muccino, A. V. Penacchioni, J. A. Rueda, Y. Wang.

6) “Erasmus Mundus School”, Les Houches, France, 11th - 16th May, 2014;

Lecture: GRBs-SNe within the Induced Gravitational Collapse model: towards a new standard candle; G. B. Pisani, R. Ruffini, C.L. Bianco, M. Enderli, L. Izzo, M. Kovacevic, M. Muccino, A. V. Penacchioni, J. A. Rueda, Y. Wang.

7) “3rd Bego Rencontres”, Nice, France, 8th – 19th September, 2014;

Lecture: Energetic GRBs-SNe within the Induced Gravitational Collapse; G. B. Pisani, R. Ruffini, C.L. Bianco, M. Enderli, L. Izzo, M. Kovacevic, M. Muccino, A. V. Penacchioni, J. A. Rueda, Y. Wang;

8) “4th Bego Rencontres”, Nice, France, 30th May – 3rd June, 2016;

Lecture: Properties of the X-ray afterglow of Binary-driven HyperNovae; G. B. Pisani, R. Ruffini, Y. Aimuratov, C.L. Bianco, M. Enderli, L. Izzo, M. Kovacevic, M. Muccino, A. V. Penacchioni, J. A. Rueda, Y. Wang.

III b. Outside ICRANet

- Academic Year 2015/2016:

Teaching activity as assistant of Professor Valerio Parisi in his “Medical Physics” classes for Medical Science students, Sapienza University of Rome;

- Academic Year 2016/2017:

Teaching activity as assistant of Professor Valerio Parisi in his “Medical Physics” classes for Medical Science students, Sapienza University of Rome;

- Academic Year 2017/2018:

Teaching activity as assistant of Doctor Stefano Sarti in his “Physics II” classes for Environmental and Geomatic Engineering students, Sapienza University of Rome.

IV. Other

2017 List of Publication

- Ruffini R., Rodriguez J., Muccino M., Rueda J.A, Aimuratov Y., Barres de Almeida U., Becerra L.M., Bianco C.L., Cherubini C., Filippi S., Gizzi D., Kovacevic M., Moradi R., Oliveira F.G., Pisani G.B., Wang Y., “On the rate and on the gravitational wave emission of short and long GRBs”, submitted to Astrophysical Journal, arXiv:1602.03545
- Ruffini, R.; Aimuratov, Y.; Becerra, L.; Bianco, C. L.; Karlica, M.; Kovacevic, M.; Melon Fuksman, J. D.; Moradi, R.; Muccino, M.; Penacchioni, A. V.; Pisani, G. B.; Primorac, D.; Rueda, J. A.; Shakeri, S.; Vereshchagin, G. V.; Wang, Y.; Xue, S.-S., “The cosmic matrix in the 50th anniversary of relativistic astrophysics”, 2017, International Journal of Modern Physics D, 26, 1730019-367
- Rueda, Jorge A.; Aimuratov, Y.; de Almeida, U. Barres; Becerra, L.; Bianco, C. L.; Cherubini, C.; Filippi, S.; Karlica, M.; Kovacevic, M.; Fuksman, J. D. Melon; Moradi, R.; Muccino, M.; Penacchioni, A. V.; Pisani, G. B.; Primorac, D.; Ruffini, R.; Sahakyan, N.; Shakeri, S.; Wang, Y., “The binary systems associated with short and long gamma-ray bursts and their detectability”, 2017, International Journal of Modern Physics D, 26, 1730016-309
- Aimuratov, Y.; Ruffini, R.; Muccino, M.; Bianco, C. L.; Penacchioni, A. V.; Pisani, G. B.; Primorac, D.; Rueda, J. A.; Wang, Y., “GRB 081024B and GRB 140402A: Two Additional Short GRBs from Binary Neutron Star Mergers”, 2017, Astrophysical Journal, 844, 83

- Luongo O., Pisani G.B., Troisi A., “Cosmological degeneracy versus cosmography: a cosmographic dark energy model”, 2017, International Journal of modern physics D, 26, 1750015

Brian Punsly

Position: Research Scientist
Period covered: 10/2016-10/2017



I Scientific Work

Black Holes and Quasars

1. Introduction

This report describes the research performed by Brian Punsly and collaborators in cooperation with ICRANet in 2016-2017. The research was directed at finding environmental factors that are related to the switch-on of the general relativistic engine responsible for a few percent of quasars driving powerful relativistic jets. This is important since this will relate directly to constraints on the initial state and boundary conditions on numerical models of black hole driven jets.

2. The Origin of the Event Horizon Scale Jet in M87

Global millimeter wavelength Very Long Baseline Interferometry (VLBI) is an ambitious program to study the event horizon scale physics of nearby active galactic nuclei (AGN). The shortest wavelength receivers have been designated as the Event Horizon Telescope (EHT). It has been widely advertised that the experiment will reveal how astrophysical black holes can drive powerful jets near the event horizon – possibly proving the Blandford-Znajek mechanism that drives jets from the event horizon itself. There is only one powerful relativistic jet source that can be explored by the EHT with resolution on the order of the event horizon dimension, the jet in the enormous radio galaxy M87. Thus, M87 is the most studied object in radio jet research.

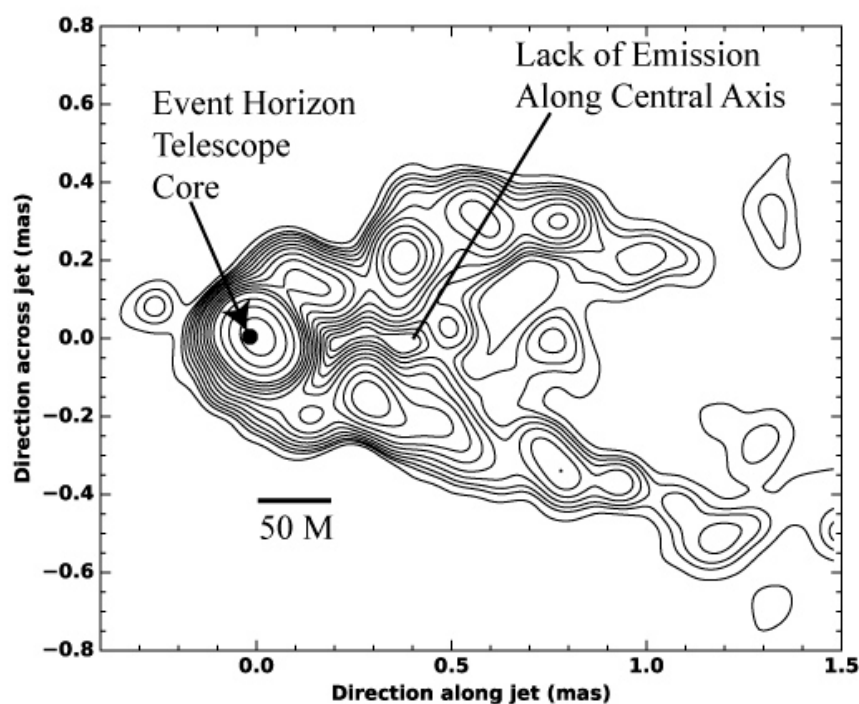


Figure 1. The 3.5 mm, global VLBI, image of Hada et al. (2016) with the EHT detected core at 1.3 mm from Akiyama et al. (2016) and Doeleman et al. (2012) overlaid. Note the extreme absence of emission along the central spine within 50 M of the black hole (the limit of the resolution of the radio image)

There is radio imaging of M87 at 3.5 mm (86 GHz) and detections with the EHT at 1.3 mm (230 GHz). The newest and most sensitive 86 GHz published image is shown in Figure 1. There is currently no imaging capability at 230 GHz. However, it seems clear from the 86 GHz image in Figure 1 that there is a flux void along the central spine above the event horizon. More specifically, the image reveals a central flux nadir within 50M (where M is the black hole in geometrized units) of the super-massive black hole.

ICRANet adjunct professor, Brian Punsly, has been collaborating with Kazuhiro Hada of Mizusawa VLBI Observatory, National Astronomical Observatory of Japan (the principal investigator on the 86 GHz observation in Figure 1) and Martin Hardcastle of Centre for Astrophysics Research, School of Physics, Astronomy and Mathematics, University of Hertfordshire in order to study this lack of emission along the spine. There are two papers. Paper 1 is a collaborative, “A New Solution to the Plasma Starved Event Horizon Magnetosphere: Application to the Forked Jet in M87”. It is currently under review with Astronomy and Astrophysics. It explains the physics that does not allow the event horizon magnetosphere to launch a powerful jet in M87, thereby producing the weak flux emission along the spine above the event horizon evident in Figure 1. This will be reported in detail in a future newsletter. In summary, for low luminosity AGN, such as M87, it is shown that accreted large scale poloidal magnetic flux is dissipated when it approaches the event horizon and no significant magnetosphere can be obtained.

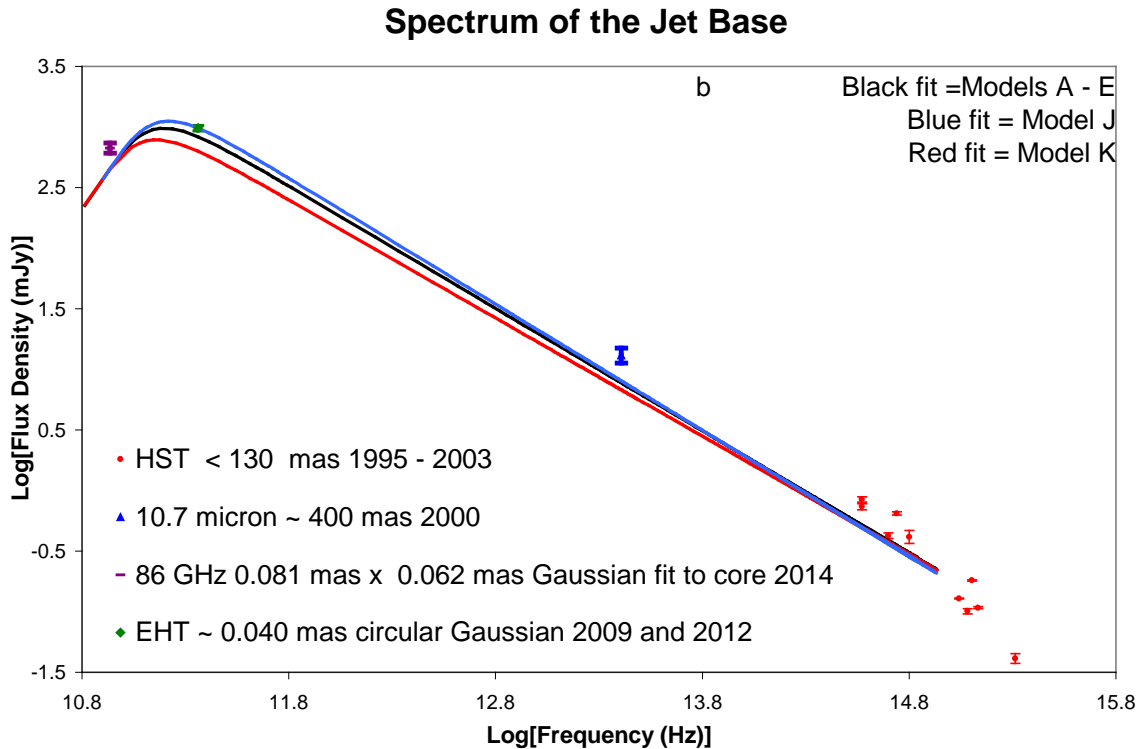


Figure 2. A hollow jet from the inner accretion can explain the broadband spectrum of the region that is the source of the correlated flux detected by the EHT (from Punsly 2018).

The second paper is a solo effort of Brian Punsly, “A Jet Source of Event Horizon Telescope Correlated Flux in M87” *ApJ* (2017). This is an important supporting work since it shows that a jet from the inner accretion flow can not only explain the broadband spectra from millimeter to the ultraviolet of the plasma responsible for the correlated flux detected by the EHT (see Figure 2), but it

also shows that such a jet can supply all the power required to explain the large scale jet in M87. This is critical because the Blandford-Znajek school claims that Figure 1 is an optical illusion. The horizon jet is far more powerful than the enveloping hollow jet, but is invisible on these scales due to a low plasma energy density. It can never be seen by any telescope, but works silently behind the scenes energizing the outer sheath and this is needed to explain the global energetics of the jet. However, the new ICRANet paper of Punsly shows that a jet from the inner accretion flow has plenty of power and no invisible powerful “ghost jet” is needed. Furthermore, the hollow jet is a direct interpretation of Figure 1 and the EHT correlated flux detection, neither of which is explained by a Blandford-Znajek “ghost jet”. There is a clear straightforward observation that could prove the EHT very valuable in this line of research. It is pointed out in Punsly (2017) that if a luminous forward jet is detected by future EHT observations on scales of less than 30 micro-arc-seconds, it would contradict the notion of a Blandford-Znajek jet and corroborate a prediction of the hollow jet with a void above the event horizon magnetosphere.

2017 List of Publication

Punsly, Brian; A Jet Source of Event Horizon Telescope Correlated Flux in M87 2017 ApJ 850 190

Punsly, Brian,, Kharb, Preeti The kinetically dominated quasar 3C 418 2017 MNRAS Lett. 468 72

Reynolds, Cormac; Punsly, Brian; Miniutti, Giovanni; O'Dea, Christopher P.; Hurley-Walker, Natasha., The Relativistic Jet-accretion Flow-Wind Connection in Mrk 231 2017 ApJ 836 155

Quevedo Hernando



Position: Full Professor - National Autonomous University of Mexico -
Period covered: 2016

I Scientific Work

Topics:

- Exterior and interior solutions of Einstein's equations and applications in relativistic astrophysics.
- The physics of naked singularities.
- Geometrothermodynamics of black holes.
- Applications of geometrothermodynamics in cosmology.
- Topological quantization of classical field theories.

II Conferences and educational activities

II a Conferences and Other External Scientific Work

- Conference: "Relativistic Geodesy: Foundations and Applications", talk: "Determination of the metric from the curvature" Bad Honnef, Germany (March 12 - 19, 2016)
- Seminar: "The postulate of Einstein - Geometry = Physics - one hundred years later", Physics Institute – BUAP, Puebla, MEXICO (May 19, 2016)
- VI Summer School in Mathematics, plenary talk: "Fundaments of geometrothermodynamics", UNAM – Juriquilla, MEXICO (June 12 – 13, 2016)
- V Academic Sessions of Basic Sciences, plenary talk: "Geometry and Thermodynamic" CIIDET, Querétaro, MEXICO (August 18 – 20, 2016)
- Conference "Phenomenology of Strong Gravity", talk: "Geometrothermodynamics of black holes" Nazarbayev University, Astana, Kazajistán (September 17 – 19, 2016)
- Research stay at the Al Farabi Kazakh National University (Almaty, Kazakhstan, (August 30 – September 24, 2016)
- Conference: "Classical and Quantum Gravity Workshop", talk: "Geometrothermodynamics of black holes", Cartagena de Indias, Colombia (September 27 - October 1, 2016).
- Visit: New Granada Military University, Bogotá, Colombia (October 2 – 11, 2016).
- Visit: National University of Colombia, talks: "Black holes geometrothermodynamics", "The future GPS: Determination of the metric from the curvature" (October 6 – 7, 2016)

II b Work With Students

II c Diploma thesis supervision

- Viridiana Pineda (PhD)
Topic: Microscopic models for black holes
- Daniel Flores (PhD)
Topic: Topological quantization of minisuperspaces
- Pedro Sánchez (PhD)
Topic: Geometrothermodynamics in relativistic astrophysics
- Juan José Vega (PhD)

Topic: Topological quantization of mechanical systems

- Raúl Meléndez (MSc)

Topic: Relativistic geometrothermodynamics

- Andrés Solís (MSc)

Topic: Matching conditions in general relativity

II d Other Teaching Duties

II e. Work With Postdocs

- Christine Gruber, UNAM

- Francisco L. Escamilla, UNAM

- Alessandro Bravetti, UNAM

III. Service activities

III a. Within ICRANet

III b. Outside ICRANet

Course: Relativistic geometrothermodynamics – UNAM

Course: Relativistic astrophysics of neutron stars – Al Farabi Kazakh National University

IV. Other

2016 List of Publication

GEODESICS IN THE FIELD OF A ROTATING DEFORMED GRAVITATIONAL SOURCE

K. A. Boshkayev, H. Quevedo, M. S. Abutalip, Zh. A. Kalymova, Sh. S. Suleymanova

INTERNATIONAL JOURNAL OF MODERN PHYSICS A Particles and Fields; Gravitation; Cosmology 31, Issue 02 and 03, 1641006

DOI: 10.1142/S0217751X16410062

MOTION OF TEST PARTICLES IN THE FIELD OF A NAKED SINGULARITY

K. Boshkayev, E. Gasperín, A. C. Gutiérrez-Piñeres, H. Quevedo, and S. Toktarbay

PHYSICAL REVIEW D 93, No. 2 024024

DOI: 10.1103/PhysRevD.93.024024

GEOMETROTHERMODYNAMICS OF PHANTOM ADS BLACK HOLES

Quevedo, Hernando; Quevedo, Maria N.; Sanchez, Alberto

EUROPEAN PHYSICAL JOURNAL C 76, 3 Article Number: 110

DOI 10.1140/epjc/s10052-016-3949-4

CARDY-VERLINDE ENTROPY IN HORAVA-LIFSHITZ GRAVITY

Luongo, Orlando; Pisani, Giovanni Battista; Quevedo, Hernando

PHYSICAL REVIEW D 93, 6 Article Number: 064057

DOI: 10.1103/PhysRevD.93.064057

TEST PARTICLES IN A MAGNETIZED CONFORMASTATIC SPACETIME

Gutierrez-Pineros, Antonio C.; Capistrano, Abraao J. S.; Quevedo, Hernando

PHYSICAL REVIEW D 93, 12 Article Number: 124009
DOI: 10.1103/PhysRevD.93.124009

EINSTEIN-MAXWELL-DILATON PHANTOM BLACK HOLES: THERMODYNAMICS AND GEOMETROTHERMODYNAMICS

Quevedo, Hernando; Quevedo, Maria N.; Sanchez, Alberto
PHYSICAL REVIEW D 94, 2 Article Number: 024057
DOI: 10.1103/PhysRevD.94.024057

INCOME DISTRIBUTION IN THE COLOMBIAN ECONOMY FROM AN ECONOPHYSICS PERSPECTIVE

H. Quevedo and M.N. Quevedo
CUADERNOS DE ECONOMIA 35 (69) 691-707

I-LOVE-Q RELATIONS FOR WHITE DWARF STARS

K. Boshkayev, H. Quevedo and B. Zhami
MONTHLY NOTICES OF THE ROYAL ASTRONOMICAL SOCIETY
DOI: 10.1093/mnras/stw2614

NEWMAN-JANIS ANSATZ IN CONFORMASTATIC SPACETIMES

Antonio C. Gutiérrez-Piñeres, Hernando Quevedo
GENERAL RELATIVITY AND GRAVITATION 48:146
DOI 10.1007/s10714-016-2144-0

A GEOMETROTHERMODYNAMIC APPROACH TO IDEAL QUANTUM GASES AND BOSE-EINSTEIN CONDENSATES

Hernando Quevedo, Sasha A. Zaldivar
e-Print: arXiv:1512.08755 Submitted: PHYSICAL REVIEW E

STOCHASTIC EINSTEIN EQUATIONS WITH FLUCTUATING VOLUME

Vladimir Dzhunushaliev , Hernando Quevedo
e-Print: arXiv:1603.00951 Submitted: GRAVITATION AND COSMOLOGY

MULTIPOLE STRUCTURE OF COMPACT OBJECTS

Hernando Quevedo
e-Print: arXiv:1606.05985
Accepted in Proceedings of the conference “Nuclear Physics and Astrophysics” (Almaty, KZ, 2016)

GEOMETRIC APPROACHES TO THE THERMODYNAMICS OF BLACK HOLES

Christine Gruber, Orlando Luongo, Hernando Quevedo
Accepted in Proceedings of the Fourteenth Marcel Grossman Meeting on General Relativity edited by Massimo Bianchi, Robert T Jantzen, Remo Ruffini

QUADRUPOLAR METRICS

Hernando Quevedo

e-Print: arXiv:1606.09361

Accepted in “Neutron Star: Physics, Properties and Dynamics” editors N. Takibayev and K. Boshkayev

HARTLE FORMALISM FOR ROTATING NEWTONIAN CONFIGURATIONS

Kuantay Boshkayev, Hernando Quevedo, Zhanerke Kalymova and Bakytzhan Zhami
European Journal of Physics, 37 (2016) 065602.

**SELF-ACCELERATED UNIVERSE INDUCED BY REPULSIVE EFFECTS AS AN
ALTERNATIVE TO DARK ENERGY AND MODIFIED GRAVITIES**

Orlando Luongo and Hernando Quevedo
e-Print: arXiv:1507.06446

Submitted to: Foundations of Physics

Rosati Piero



Position: Full Professor in Astrophysics at University of Ferrara
Period covered: since 9/2013

I Scientific Work

Main fields of research in 2014:

Observational Cosmology; X-ray and Optical Studies of Distant Galaxy Clusters; Galaxy Formation and Evolution; Gravitational Lensing; Dark Matter; High-redshift galaxies

II Conferences and educational activities

II a Scientific Organizing Committee of:

- “PARIS CLUSTERS 2014, Future Directions in Galaxy Cluster Surveys”, June 23-25, 2014
- “*The first billion years of galaxies and black-holes*”, 30/6-4/7, Sesto (BZ), Italy

II b Supervision of PhD Erasmus Mundus Student Camilo Delgado

II d Other Teaching Duties

- Course at University of Ferrara, Physics Dept. “*Elements of Astrophysics*”
- Course at University of Ferrara, Chemistry Undergraduate: “*Physics I*”.

II e. Supervision of CAPES-ICRANet post-doc Gabriel Bartosch Caminha

III. Service activities

III a. Within ICRANet

- Delivered lectures for the IRAP-PhD School in Nice in February and September 2014 on “*Constraining dark matter with galaxy clusters*”

2014 List of Publications

- Grillo, C., Suyu, S.H., Rosati, P., Mercurio, A., Balestra, I. et al. (23 other coauthors) 2014 *CLASH-VLT: Insights on the mass substructures in the Frontier Fields Cluster MACS J0416.1-2403 through accurate strong lens modeling*, ApJ, submitted (2014) (arXiv1407.7866)
- R. Bouwens et al. (37 coauthors including P. Rosati) *A Census of Star-forming Galaxies in the $Z \sim 9$ -10 Universe based on HST+Spitzer Observations over 19 Clash Clusters: Three Candidate $Z \sim 9$ -10 Galaxies and Improved Constraints on the Star Formation Rate Density at $z \sim 9.2$* (2014), ApJ, 795, 126 (2014)

- M. Donahue et al. (38 coauthors including P. Rosati); *CLASH-X: A Comparison of Lensing and X-ray Techniques for Measuring the Mass Profiles of Galaxy Clusters*, ApJ, 794, 136, (2014) (arXiv1405.7876)
- K. Umetsu et al. (41 coauthors including P. Rosati); *CLASH: Weak-Lensing Shear-and-Magnification Analysis of 20 Galaxy Clusters*, ApJ, 795, 163 (2014) (arXiv1404.1376)
- J. Merten et al. (41 coauthors including P. Rosati) 2014 ; *CLASH: The Concentration-Mass Relation of Galaxy Clusters*, ApJ, in press (2014) (arXiv1405.7876)
- M. Meneghetti et al. (45 coauthors including P. Rosati) 2014 ; *The MUSIC of CLASH: predictions on the concentration-mass relation*, ApJ, in press (2014) (arXiv1404.1384)
- Annunziatella, M., Biviano, A., Mercurio, A., Nonino, A., Rosati, P. et al. (22 other coauthors) 2014; *CLASH-VLT: The stellar mass function and stellar mass density profile of the $z = 0.44$ cluster of galaxies MACS J1206.2-0847*, A&A, in press (2014)
- R. Fassbender et al. (23 coauthors including P. Rosati); *Galaxy population properties of the massive X-ray luminous galaxy cluster XDCP J0044.0- 2033 at $z = 1.58$: red-sequence formation, massive galaxy assembly, and central star formation activity*, A&A, 568, A5 (2014)
- Tozzi, P., Moretti, A., Tundo, E., Liu, T., Rosati, P. et al. (5 other coauthors) The Swift X-ray Telescope Cluster Survey. II. X-ray spectral analysis, A&A, 567, 89A (2014)
- Grillo, C., Gobat, R., Presotto, V., Balestra, I., Mercurio, A., Rosati, P. et al. (32 other coauthors), *CLASH: Extending Galaxy Strong Lensing to Small Physical Scales with Distant Sources Highly Magnified by Galaxy Cluster Members*, ApJ, 786, 11 (2014)
- P. Brandon et al. (45 coauthors including P. Rosati); *Three Gravitationally Lensed Supernovae behind CLASH Galaxy Clusters*, ApJ, 786, 9 (2014)
- Presotto, V., Girardi, M., Nonino, M., Mercurio, A., Grillo, C., Rosati, P. et al. (33 other coauthors); *Intracuster light properties in the CLASH-VLT cluster MACS J1206.2-0847*, A&A, 565, 126A (2014)
- De Grandi, S., Santos, J.S., Nonino, M., Molendi, S., Tozzi, P., Rossetti, M., Fritz, A., Rosati, P. ; *On the Fe abundance peak formation in cool-core clusters of galaxies: hints from cluster WARPJ1415.1+3612 at $z = 1.03$* , A&A, 567, 102A (2014)
- A. Nastasi et al. (14 coauthors including P. Rosati) *Kinematic analysis of a sample of X-ray luminous distant galaxy clusters. The $L_X - \sigma_v$ relation in the $z > 0.6$ universe*, A&A, 562, 17A (2014)
- R. Smit et al. (33 coauthors including P. Rosati) *Evidence for Ubiquitous High-equivalent-width Nebular Emission in $z \sim 7$ Galaxies: Toward a Clean Measurement of the Specific Star-formation Rate Using a Sample of Bright, Magnified Galaxies*, ApJ, 784, 58 (2014)
- E. Vanzella et al. (21 coauthors including P. Rosati) *Characterizing faint galaxies in the reionization epoch: LBT confirms two $L < 0.2L^*$ sources at $z = 6.4$ behind the CLASH/Frontier Fields cluster MACS0717.5+3745*, ApJ, 783, L12 (2014)
- Sartoris, B., Biviano, A., Rosati, P., Borgani, S., Umetsu, K. et al. (37 other coauthors); *CLASH-VLT: Constraints on the Dark Matter Equation of State from Accurate Measurements of Galaxy*

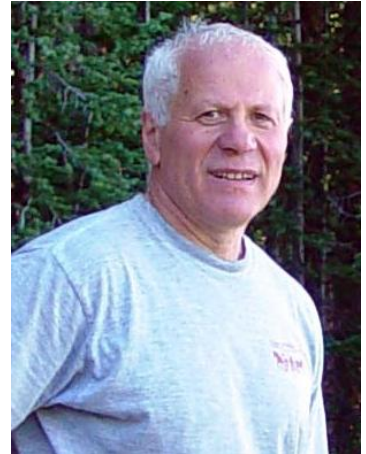
Cluster Mass Profiles, ApJ, 783, L11 (2014)

- O. Graur et al. (41 coauthors including P. Rosati); *Type-Ia Supernova Rates to Redshift 2.4 from CLASH: The Cluster Lensing And Supernova Survey with Hubble*, ApJ, 783, 28 (2014)
- S. Jouvel et al. (38 coauthors including P. Rosati); *CLASH: Photometric redshifts with 16 HST bands in galaxy cluster fields*, A&A, 562, 86A (2014)
- A. Monna et al. (30 coauthors including P. Rosati); *CLASH: $z \sim 6$ young galaxy candidate quintuply lensed by the frontier field cluster RXC J2248.7-4431*, MNRAS, 438, 1417 (2014)

Titarchuk Lev

Position: Professor

Period covered: From 1st of November, 2013 to 1st of November, 2014



I Scientific Work

Study of spectral and timing characteristics of black hole and neutron star sources

II Conferences and educational activities

II a Conferences and Other External Scientific Work

High Energy Astrophysics meeting in Moscow, Russia, December 24-24, 2013;

International meeting devoted to 100th anniversary of Zel'dovich, Minsk, Belorussia, March 2014;

Zeldovich 100, International conference on Cosmology and Relativistic Astrophysics, June, 2014; The Unquite Universe Cefalu 2-14, 2014

II b Work With Students

Tais Maiolino, ICRANET student. Study of iron-line features in black hole, neutron star and white-dwarf sources. Comparative analysis.

II c Diploma thesis supervision

II d Other Teaching Duties

Lectures on Mathematical Physics and High Energy Astrophysics.

II e. Work With Postdocs

2014 List of Publication

1. Jang, I.; Gliozzi, M.; Hughes, C.; Titarchuk, L. "Constraining black hole masses in low-accreting active galactic nuclei using X-ray spectra", 2014, MNRAS, 443, 72
2. Titarchuk, Lev; Seifina, Elena; Shrader, Chris "X-Ray Spectral and Timing Behavior of Scorpius X-1. Spectral Hardening during the Flaring Branch", 2014, ApJ, 98
3. Seifina, Elena; Titarchuk, Lev; Shaposhnikov, Nikolai "Black Hole Mass Determination in the X-Ray Binary 4U 1630-47: Scaling of Spectral and Variability Characteristics", 2014, 789, 57
4. Amati, Lorenzo et al. "GAME: GRB and All-sky Monitor Experiment", 2014, IJMPD, 2330010
5. Ceccobello, C.; Farinelli, R.; Titarchuk, L. "Comptonization in ultra-strong magnetic fields: numerical solution to the radiative transfer problem", 2014, A&A, 562, 99
6. Giacchè, S.; Gilli, R.; Titarchuk, L. "Analysis of X-ray spectral variability and black hole mass determination of the NLS1 galaxy Mrk 766", 2014, A&A, 562, 44

7. Seifina, Elena; Titarchuk, Lev; Frontera, Filippo ``The unique stability of the photon indices in "dipping" Z-source GX 340+0 throughout spectral states'', 2014, COSPAR, 40E2956
8. Frontera, F.; Amati, L.; Farinelli, R.; Dichiara, S.; Guidorzi, C.; Landi, R.; Titarchuk, L. ``Comptonization Signatures in the Prompt Emission of Gamma-Ray Bursts'', 2013, ApJ, 779, 175
9. Frontera, F. et al. ``Scientific prospects in soft gamma-ray astronomy enabled by the LAUE project'', 2013, SPIE.8861E06
10. Titarchuk, L.; Farinelli, R. ``On Amati Relation For GRB Prompt Emission'', 2013, EAS, 61 129
11. Titarchuk, Lev; Seifina, Elena; Frontera, Filippo ``Spectral State Evolution of 4U 1820-30: The Stability of the Spectral Index of the Comptonization Tail'', 2013, ApJ, 767, 160
12. Seifina, Elena; Titarchuk, Lev; Frontera, Filippo ``Stability of the Photon Indices in Z-source GX 340+0 for Spectral States'', 2013, ApJ, 766, 63.

The total citation index of Lev Titarchuk on 6th of November is 5613. Among all papers, 10 papers have a citation indices higher than 100.

Zen Vasconcellos, César Augusto

Position: **Full Professor** – Universidade Federal do Rio Grande do Sul (UFRGS), Porto Alegre, Brazil

Adjoint Professor – ICRANet, Rome and Pescara, Italy

Period covered: 2015 - 2017



I Scientific Work

II Conferences and educational activities

II a Conferences and Other External Scientific Work:

1. *Chair of STARS2015 - 3th Caribbean Symposium on Cosmology, Gravitation, Nuclear and Astroparticle Physics/SMFNS2015 - 4th International Symposium on Strong Electromagnetic Fields and Neutron Stars, held in Havana and Varadero, Cuba, from 10 to 16 May, 2015* <https://indico.cern.ch/event/328198/>
2. *Chair of IWARA 2016 - 7th International Workshop on Astronomy and Relativistic Astrophysics, held in Gramado, Brazil, from 9 to 13 of October, 2016* <http://www.if.ufrgs.br/IWARA2016/index.html>
3. *Chair of STARS2017 - 4th Caribbean Symposium on Cosmology, Gravitation, Nuclear and Astroparticle Physics/SMFNS2017 - 5th International Symposium on Strong Electromagnetic Fields and Neutron Stars, held in Havana and Varadero, Cuba, from 3 to 13 May, 2017* <https://indico.cern.ch/event/542644/>
4. *Chair of the IWARA2018 - 8th International Workshop on Astronomy and Relativistic Astrophysics, to be held in Ollantaytambo, Peru, from 9 to 15 September 2018* <https://indico.cern.ch/event/646046/>
5. *Chair of Chair of STARS2019 - 5th Caribbean Symposium on Cosmology, Gravitation, Nuclear and Astroparticle Physics/SMFNS2019 - 6th International Symposium on Strong Electromagnetic Fields and Neutron Stars, to be held in Havana and Varadero, Cuba, from 6 to 11 May, 2019*

II b Work With Students

II c Diploma thesis supervision: PhD Student Fabio Kopp (UFRGS), on “Compact Stars and Dark Energy”

II d Other Teaching Duties

II e. Work With Postdocs

III. Service activities [activities carried out in collaboration with ICRANet (e.g. teaching activities, conferences etc...) and outside ICRANet (teaching activities in your university etc...)]

III a. Within ICRANet

III b. Outside ICRANet

IV. Other

2017 List of Publication

1. **4th Caribbean Symposium on Cosmology, Gravitation, Nuclear and Astroparticle Physics; 5th International Symposium on Strong Electromagnetic Fields and Neutron Stars**, *Astronomische Nachrichten*, Volume 338, Issue 9-10, Pages 963–1173. Issue edited by: Th. Boller, R. González Felipe, A. Pérez Martínez, H. Pérez Rojas, M. M. Roth, C. Zen Vasconcellos. <http://onlinelibrary.wiley.com/doi/10.1002/asna.v338.9-10/issuetoc>
2. **Effective field theory for neutron stars with WIMPS in the pc-GR formalism**, M. Razeira, D. Hadjimichef, M.V.T. Machado, F. Köpp, G.L. Volkmer and C.A.Z. Vasconcellos, *Astronomische Nachrichten*, Volume 338, Issue 9-10, Pages 1073–1078, DOI: 10.1002/asna.201713438. <http://onlinelibrary.wiley.com/doi/10.1002/asna.v338.9-10/issuetoc>
3. **A dark matter compact star in the framework of the pseudo-complex general relativity**, D. Hadjimichef, M.V.T. Machado, F. Köpp, G.L. Volkmer, M. Razeira and C.A.Z. Vasconcellos, *Astronomische Nachrichten*, Volume 338, Issue 9-10, Pages 1079–1084, DOI: 10.1002/asna.201713439. <http://onlinelibrary.wiley.com/doi/10.1002/asna.v338.9-10/issuetoc>
4. **Equilibrium configurations of white dwarfs in the pseudo-complex general relativity**, J. E. S. Costa, D. Hadjimichef, M. V. T. Machado, F. Köpp, G. L. Volkmer, M. Razeira and C. A. Z. Vasconcellos, *Astronomische Nachrichten*, Volume 338, Issue 9-10, Pages 1085–1089, DOI: 10.1002/asna.201713440. <http://onlinelibrary.wiley.com/doi/10.1002/asna.v338.9-10/issuetoc>
5. **Dark matter compact stars in pseudo-complex general relativity**, D. Hadjimichef, G. L. Volkmer, R. O. Gomes and C. A. Zen Vasconcellos, to appear in *Walter Greiner Memorial Volume*, Edited by: Peter O Hess (Universidad Nacional Autónoma de México, Mexico & Goethe-Universität, Frankfurt, Germany), Horst Stöcker (Goethe-Universität, Frankfurt, Germany) (World Scientific, Singapura, 2017). <http://www.worldscientific.com/worldscibooks/10.1142/10828>
6. **Proceedings of the 7th International Workshop on Astronomy and Relativistic Astrophysics** (IWARA 2016); Gramado, Rio Grande do Sul, Brazil, 9–13 October 2016; Editors: Alexander Lunkes dos Santos, César Augusto Zen Vasconcellos, Daniel Tavares da Silva, Dimiter Hadjimichef, Fridolin Weber, Magno Valério Trindade Machado, Mário Luiz Lopes da Silva, Renxin Xu, and Walter Greiner* (*Deceased.). *International Journal of Modern Physics: Conference Series* (World Scientific, Singapura, 2017) <http://www.worldscientific.com/toc/ijmpcs/45>
7. **Walter Greiner: In Memoriam**, César Zen Vasconcellos, Helio T. Coelho, Peter Otto Hess, *International Journal of Modern Physics: Conference Series* (World Scientific, Singapura, 2017) https://doi.org/10.1142/S2010194517600011_1760001
8. **Highly magnetized neutron stars in a many-body forces formalism**, Rosana O. Gomes, Cesar A. Z. Vasconcellos, Bruno Franzon, Stefan Schramm, Veronica Dexheimer, , *International Journal of Modern Physics: Conference Series* (World Scientific, Singapura, 2017) https://doi.org/10.1142/S2010194517600333_1760033 *Int.J.Mod.Phys.Conf.Ser.* 45 (2017) 1760033, DOI: 10.1142/S2010194517600333
9. **Centennial of General Relativity: A Celebration**, Edited by: César Augusto Zen Vasconcellos (Universidade Federal do Rio Grande do Sul, Brazil & ICRANet, Italy), (World

- Scientific, Singapura, 2017), 336pp, Apr 2017, ISBN: 978-981-4699-65-5 (hardcover). Contents: General Relativity and Compact Stars (Norman K Glendenning); Non-Spherical Compact Stellar Objects in Einstein's Theory of General Relativity (Omar Zubairi and Fridolin Weber); Pseudo-Complex General Relativity: Theory and Observational Consequences (Peter O Hess and Walter Greiner); Strange Matter: A State before Black Hole (Renxin Xu and Yanjun Guo), Building Non-Spherical Cosmic Structures (Roberto A Sussman); Cosmology after Einstein (Marc Lachièze-Rey); Highlights of Standard Model Results from ATLAS and CMS (Cristina Biino); Beyond the Standard Model Searches at ATLAS and CMS (Géraldine Conti); Results from LHCb (Katharina Müller); TeV Astrophysics: Probing the Relativistic Universe (Ulisses Barres de Almeida); Observation of Gravitational Waves from a Binary Black Hole Merger (B P Abbott et al.) <http://www.worldscientific.com/worldscibooks/10.1142/9690>
10. **Fine-tuning in scalar meson decay with bound-state corrections**, M.L.L. da Silva, D.T. da Silva, C.A.Z. Vasconcellos, D. Hadjimichef. Dec 22, 2017. 6 pp. e-Print: arXiv:1712.08503 [hep-ph]
 11. **A review on the relativistic effective field theory with parameterized couplings for nuclear matter and neutron stars**, C.A. Zen Vasconcellos (Rio Grande do Sul U. & ICRA, Pescara). 2015. , Published in AIP Conf.Proc. 1693 (2015) 030002, DOI: 10.1063/1.4937185
 12. **Proceedings, 2nd ICRANet César Lattes Meeting: Supernovae, Neutron Stars and Black Holes**, Niterói, Rio de Janeiro, Brazil, April 13-18, 2015, João Pessoa, Brazil, April 21, 2015, Recife, Fortaleza, Brazil, April 22, 2015, Ulisses Barres de Almeida (ed.), Pascal Chardonnet (ed.), Rodrigo Negreiros (ed.), Jorge Rueda (ed.), Remo Ruffini (ed.), Gregory Vereshchagin (ed.), César Zen Vasconcellos (ed.). 2015. Published in AIP Conf.Proc. 1693 (2015)
 13. **Z' decay and dark matter relic density in a Stueckelberg extension of the Standard Model**, A.L. dos Santos (Rio Grande do Sul U.), C.A. Z. Vasconcellos (Rio Grande do Sul U. & ICRA, Pescara). 2015. 5 pp. Published in Astron.Nachr. 336 (2015) no.8/9, 900-904 DOI: 10.1002/asna.201512246
 14. **An effective field theory for neutron stars with many- body forces, strong Σ^- repulsion, and K^- and $K^0 K^0$ condensation**, A. Mesquita, M. Razeira, R. Ruffini, J.A. Rueda, D. Hadjimichef, R.O. Gomes, C.A. Zen Vasconcellos. 2015. 5 pp. Published in Astron.Nachr. 336 (2015) no.8/9, 880-884, DOI: 10.1002/asna.201512242
 15. **Many-body forces in the equation of state of hyperonic matter**, R.O. Gomes (Rio Grande do Sul U. & Frankfurt U., FIAS), V. Dexheimer (Kent State U.), S. Schramm (Frankfurt U., FIAS), C.A.Z. Vasconcellos (Rio Grande do Sul U. & ICRA, Pescara). Nov 18, 2014. 21 pp. Published in Astrophys.J. 808 (2015) no.1, 8, DOI: 10.1088/0004-637X/808/1/8
 16. **3th Caribbean Symposium on Cosmology, Gravitation, Nuclear and Astroparticle Physics; 4th International Symposium on Strong Electromagnetic Fields and Neutron Stars**, Astronomische Nachrichten, Volume 336, Issue 8-9, Pages 715–908. Issue edited by: Th. Boller, R. González Felipe, A. Pérez Martínez, H. Pérez Rojas, M. M. Roth, C. Zen Vasconcellos, <http://onlinelibrary.wiley.com/doi/10.1002/asna.v336.8/9/issuetoc>

Lecturers

Aksenov Alexey

Position: Senior scientific staff member
Dep. of Comp. Methods, Information and Management Institute
for Computer-Aided Design, RAS, Moscow



I Scientific Work

Collapse of stars cores, neutrino transport, multidimensional multi-temperature hydrodynamic simulations, simulations of the countercurrent in a gas centrifuge, one dimensional radiative transfer codes, a numerical modeling of electron-positron pairs and photons transfer, etc.

II Conferences and educational activities

II a Conferences and Other External Scientific Work

1. Aksenov A.G. Numerical simulations of the gravitational core collapse and Supernova// BelINP-2017 1st International Symposium Integration of Belarusian scientists in the research programs of the world's leading nuclear physics centers and ICRANet-Minsk Workshop April 26-28, 2017 Minsk
2. Aksenov A.G. (with Chechetkin V.M.) Mechanism of the explosion of the collapsing supernovae. Ginsburg conference on Physics, Lebedev Institute, May 29 --- June 3, 2017 http://gc2.lpi.ru/proc_astro.html
3. Aksenov A.G. Physical mechanisms of the star explosion at late stage of the evolution// RUDN University LIH conference on problems of dynamics, particles physics, plasma physics, and optoelectronic, Moscow 15—19 May 15—19 2017 (in russian)

II b Work With Students

II c Diploma thesis supervision

II d Other Teaching Duties

II e. Work With Postdocs

III. Service activities *[activities carried out in collaboration with ICRANet (e.g. teaching activities, conferences etc...) and outside ICRANet (teaching activities in your university etc...)]*

III a. Within ICRA_{Net}

III b. Outside ICRA_{Net}

1989—1992 engineer, Laboratory for Astrophysics and Plasma Physics of the Institute for Theoretical and Experimental Physics (ITEP); 1992—1999 Junior sci. staff member, ITEP; 1999—2008 scientific staff member, ITEP; 2008—now Senior scientific staff member, department for mathematical modeling and turbulence, Institute for Computer-Aid design, Russian academy of Sciences.

IV. Other

2017 List of Publication

1. Vereshchagin G.V., Aksenov A.G. Relativistic Kinetic Theory with applications in astrophysics and cosmology. Cambridge, UK: Cambridge University Press, 2017. isbn: 9781107048225
2. Aksenov A.G. The supernova explosion and the large-scale convective instability in a proto-neutron star// proc. The Fourteenth Marcel Grossmann Meeting On Recent Developments in Theoretical and Experimental General Relativity, Astrophysics, and Relativistic Field Theories, World Scientific, ISBN: 978-981-3226-59-3 pp. 1114--1119

Alekseev George A.

Position: Leading researcher,
 Steklov Mathematical Institute
 of the Russian Academy of Sciences
 Moscow, Russia

Period covered: 1975 – present time



I Scientific Work

Further development of the theory of integrable reductions of Einstein's field equations and its applications in General Relativity and other gravity, string gravity and supergravity models in four and higher dimensions. Construction of physically interesting solutions for stationary axisymmetric fields, interacting gravitational and electromagnetic waves or cosmological models and studies of their physical and geometrical properties.

II Conferences and educational activities

II a Conferences and Other External Scientific Work

- ❖ VIII-th International Conference "SOLITONS, COLLAPSES AND TURBULENCE: Achievements, Developments and Perspectives" (SCT-17) in honor of Evgeny Kuznetsov's 70th birthday

May 21 - 25, Chernogolovka, Moscow region, Russian Federation

Invited talk: G.A.Alekseev, " *Collision of gravitational and electromagnetic solitons with strong electromagnetic waves of arbitrary amplitudes and profiles in the expanding background space-time* " 30 min

Abstract

A class of exact solutions of Einstein - Maxwell equations which describe the collision and nonlinear interaction of gravitational and electromagnetic soliton waves with strong non-soliton electromagnetic traveling waves of arbitrary amplitudes and profiles propagating in the expanding background space-time is presented. In contrast to intuitive expectations that rather strong traveling waves can destroy the soliton, it occurs that the soliton survives during its interaction with electromagnetic waves of arbitrary amplitude and profile, but its parameters begin to evolve under the influence of this interaction. If a traveling electromagnetic wave possesses a finite duration, the soliton parameters after interaction take constant values again, but these values in general are different from those before the interaction. These solutions of the Einstein-Maxwell equations demonstrate a series of nonlinear phenomena, such as (a) creation of gravitational waves in the collision of two electromagnetic waves, (b) creation of electromagnetic soliton waves in the collision of a gravitational soliton with traveling electromagnetic waves, (c) scattering of a part of a soliton wave in the direction of propagation of a traveling electromagnetic wave, and (d) quasi-periodic oscillating character of fields in the

wave interaction region and multiple mutual transformations of gravitational and electromagnetic waves in this region.

- ❖ All-Russian conference "Modern Problems of Continuum Mechanics" devoted to 110 anniversary of L. I. Sedov
Moscow, Russia, November 13–15, 2017, Steklov Mathematical Institute RAS.

Plenary talk: G.A.Alekseev, ``Nonlinear interaction of strong gravitational and electromagnetic waves in the expanding universe'' 45 min

<http://www.mathnet.ru:8080/PresentFiles/18647/18647.pdf>

Visits:

II b Work With Students

II c Diploma thesis supervision

II d Other Teaching Duties

II e. Work With Postdocs

III. Service activities

III a. Within ICRANet

III b. Outside ICRANet

IV. Other

The letter from American Physical Society:

"It is with pleasure and gratitude that I am able to inform you that you are one of the 2017 group of Outstanding Referees of the Physical Review journals, as chosen by the journal editors. "

Pierre Meystre

Editor in Chief

American Physical Society

(<http://journals.aps.org/OutstandingReferees>)

2017 List of Publications

- ❖ G.A. Alekseev, "Geodesic" motion of a Schwarzschild black hole along a magnetic field in $AdS_2 \times S^2$ space-time", Proceedings of the Fourteenth Marcel Grossman Meeting on General Relativity,

edited by Massimo Bianchi, Robert T Jantzen, Remo Ruffini, World Scientific, Singapore, 2017, pp. 2560 - 2564 (https://doi.org/10.1142/9789813226609_0306)

Abstract

The exact solution of Einstein-Maxwell equations for a Schwarzschild black hole immersed in the static spatially homogeneous $\text{AdS}^2 \times \mathbb{S}^2$ space-time of Bertotti-Robinson magnetic universe is presented. In this solution, the black hole possesses a finite initial boost in the direction of the magnetic field and performs a “geodesic” oscillating motion interacting with the background gravitational and electromagnetic field.

Lee Chul Hoon

Position: Visiting Scientist
Period covered: 4-18, July 2010

Conferences and educational activities

The 2nd Galileo-XuGuangqi Meeting (Ventimiglia, Italy; 11-16, July 2010)



2010 List of Publications

“Instanton solutions mediating tunneling between the degenerate vacua in curved space”

Bum-Hoon Lee, Chul H. Lee, Wonwoo Lee and Changheon Oh

Phys. Rev. D82, 024019 (2010)

Hyun Kyu, Lee

Position: Professor

Period covered: July 4, 2010 – July 25, 2010

Conferences and educational activities

Conferences and Other External Scientific Works

"Structure of Compact Stars with Dense Hadronic Matter at the Core,"
2nd Galileo-Xu Guangqi Conference, Ventimiglia, Italy, July 12 - 16, 2010.

Discussions on the Korea-ICRANET



2010 List of Publications

Effective Action of QED in Electric Field Backgrounds II. Spatially Localized Fields" (with S.P. Kim, Y. Yoon),
Physical Review D 82, 025015(2010)

Nonperturbative QED Effective Action at Finite Temperature" (with S.P. Kim, Y. Yoon), Physical Review D 82,
025016(2010)

"Dilatons for dense hadronic matter" (with M. Rho), Nuclear Physics A 844(2010)

Pair Production of Majorana Neutrinos by Annihilation of Charged Particles in High Energy Collision" (with Y.
Goh, W-G. Paeng, Y. Yoon), J.Korean Phys. Soc. 56, 6(2010)

Mester John C.

Position: W.W. Hansen Experimental Physics Laboratory
Stanford University, Stanford

EDUCATION

Ph.D. in Physics, Harvard University 1992
Dissertation: *Scattering of Atomic Hydrogen and Helium at Low Temperature*
M.A. in Physics, Harvard University 1985
B.S. in Physics and Mathematics, with highest honors, Johns Hopkins University 1983

PROFESIONAL AFFILIATIONS

Vice Chair, Scientific Committee, ICRANet 2006 – present
Vice Chair, COSPAR Commission H: Fundamental Physics in Space 2004 – present
American Physical Society
Phi Beta Kappa

EXPERIENCE

Hansen Experimental Physics Laboratory, Stanford University 1992 – present

Lecturer: 2009 – present
Stanford Aero/Astro Department

- Lead graduate course on Space Systems Engineering and Design

Director: 2006 – present

Precision Spacecraft Control for Space Science Missions.

- Founded program and secured external funding
- Lead collaboration among American, German, and Italian research organizations
- Design and validate precision attitude and translation control systems for future scientific satellite missions
- Develop hardware-in-the-loop drag free control spacecraft simulations with integrated GPS, optical, and inertial sensors
- Advise 3 visiting research students and one Ph.D. candidate at Stanford

Program Manager and Co-Investigator: 1999 – present

The Satellite Test of the Equivalence Principle (STEP) Program – a NASA and European sponsored technology development collaboration.

- Manage the lead team of scientists and engineers at Stanford
- Direct international STEP collaboration among 12 institutions in Europe
- Lead Small Explorer proposal team of 14 professionals at Stanford, NASA Marshall Spaceflight Center, Teledyne Brown Engineering, Lockheed Martin, Surrey Satellite Ltd. and EADS
- Develop systems requirements and design requirements traceability
- Represent STEP program at NASA and Congressional staff meetings

- Lead flight hardware and payload engineering unit manufacture and test at Stanford University laboratories and facilities
- Advise Stanford students and Ph.D. candidates

EXPERIENCE continued

Hansen Experimental Physics Laboratory, Stanford University

Senior Research Scientist:

1992 – 2005

The Gravity Probe B Relativity Mission (GP-B) – a \$750 million NASA sponsored, space science mission, successfully launched April 20, 2004.

- Conducted research on cryogenic and magnetic systems for space applications
- Established engineering teams at Stanford and contractor Lockheed Martin to ensure key requirements compliance - Achieved the most stringent magnetic requirements of any NASA flight program
- Designed and built specialized test apparatus including a large scale SQUID-based cryogenic magnetic screening device and a picoTesla absolute field magnetometer
- Led Gyro Spin-up Gas Management Assembly system development, test, and integration
- Payload Integrated Product Team Lead responsible for payload assembly, test and integration with spacecraft
- Mission Director (one of five) from launch through the completion of science mission – directed mission operations/spacecraft communications team of 22 people

Goettel & Associates, Inc. Davis, CA 95616

1997 – present

Consultant:

- Conduct benefit-cost analyses and review hazard mitigation programs for FEMA, State agencies, and private sector clients
- Develop mathematical models for flood and earthquake hazard scenarios

Institut Henri Poincaré, UMPC Université de Paris VI, Paris, France

2006

Visiting Professor:

- Developed and taught graduate course on experimental tests of General Relativity
- Invited Speaker, Poincaré Seminar public lecture series

Perez Bergliaffa Santiago Esteban

Position: Professor, Department of Physics

University of the State of Rio de Janeiro

Period covered: 2011-2012



I Scientific Work

An analysis of a regular black hole interior.

Daniela Perez, Camila A. Correa, Santiago E. Perez-Bergliaffa, Gustavo E. Romero.

arXiv:1111.0690 [astro-ph.CO]

Manuscript being reviewed for publication in Gravitation and Cosmology

A Born-Infeld-like $f(R)$ gravity.

J.C. Fabris, R.S. Perez, N. Pinto-Neto, Santiago Esteban Perez Bergliaffa

arXiv:1205.3458 [gr-qc]

Accepted for publication in PRD

Accretion disks around black holes in modified strong gravity

Daniela Perez, Gustavo Esteban Romero, Santiago E. Perez Bergliaffa

Accepted for publication in Astronomy & Astrophysics

II Conferences and educational activities

II a Conferences and Other External Scientific Work

Static and spherically symmetric black holes with nonlinear electromagnetic source, talk given at the parallel session BH3 of the 13th Marcel Grossmann Meeting on General Relativity, held in Stockholm on July 1-7, 2012.

(Yet) another view of the effective metric, talk given at the Mario Novello's 70th anniversary symposium, held at CBPF (Rio de Janeiro, on August 15-17, 2012.

Dark energy and inhomogeneous cosmological models, talk given at the 55th meeting of the Asociación Argentina de Astronomía, Mar del Plata (Argentina), September 2012.

The Dark Side of the Universe, colloquium given at the Department of Physics of the CINVESTAV (Mexico City), on February 29, 2012.

Member of the Organizing Committee of the Mário Novello's 70th Anniversary Symposium, held at CBPF, (Rio de Janeiro), on August 15-17, 2012.

II b Work With Students

Introduction to scientific research (program for advanced bachelor students)

Vitor Silva Tavares, Inhomogeneous Cosmology (UERJ).

Diana Fernandes Carelli Gomes, Black Holes and gravity in the strong-curvature regime (UERJ).

Daiana Silva, Compact Objects, (UERJ).

II c Diploma thesis supervision

Claudia Isabel Azucena P. Rivasplata, "Applications of the effective metric", PhD in Physics, co-advisor: José Salim (CBPF).

Florencia Anabella Teppa Pannia, "Cosmology and inhomogeneous models", PhD in Astronomy (University of La Plata, Argentina) – advisor.

Márcio Oliveira Pinheiro, "Limits on theories of gravity in the strong-field regime", MSc in Physics (UERJ), advisor.

Ana Paula Cardozo Correia, "Observable effects of Bohmian Mechanics", MSc in Physics, (UERJ), advisor.

II d Other Teaching Duties

I taught several courses at the graduate and post-graduate level in the Institute of Physics of the UERJ.

III Service activities

Outside ICRANet

Vice-coordinator of the Post-graduation programme of the Instituto de Física (UERJ).

IV Other

Reviewer of Classical and Quantum Gravity.

Reviewer of International Journal of Theoretical Physics.

Reviewer of Physical Review D.

Sang Pyo Kim

Position: Professor of Physics, Kunsan National University,
Kunsan 54150, Korea

Period covered: 1992-present



I Scientific Work

II Conferences and educational activities

II a Conferences and Other External Scientific Work
Co-chaired ICGAC13 and IK15, July 4-8, 2018, Seoul, Korea

II b Work With Students

II c Diploma thesis supervision

II d Other Teaching Duties

II e. Work With Postdocs

III. Service activities*[activities carried out in collaboration with ICRAANet(e.g. teaching activities, conferences etc...)
and outside ICRAANet (teaching activities in your university etc...)]*

III a. Within ICRAANet

- Ehsan Bavarsad, Sang Pyo Kim, Clément Stahl, She-Sheng Xue, “Schwinger mechanism in electromagnetic field in de Sitter spacetime,” EPJ Web Conf. 168 (2018) 03002 DOI: 10.1051/epjconf/201816803002
- Ehsan Bavarsad, Sang Pyo Kim, Clément Stahl, She-Sheng Xue, “Effect of a magnetic field on Schwinger mechanism in de Sitter spacetime,”Physical Review D 97, No. 1 (2018) [arXiv:1707.03975]
- Sang Pyo Kim, “Pair Production, Vacuum Polarization and Anomaly in (A)dS and Charged Black Holes,” XIII Marcel Grossmann Meeting DOI: 10.1142/9789813226609_0590

- Sang Pyo Kim, “Scalar QED action density and Schwinger pair production in (A)dS₂,”XIII Marcel Grossmann Meeting
DOI: 10.1142/9789813226609_0545

III b. Outside ICRANet

IV. Other

2017 List of Publication

- Chiang-Mei Chen, Sang Pyo Kim, Jia-Rui Sun, Fu-Yi Tang, Published in , “Scalar Dyon Production In Near Extremal Kerr-Newman Black Holes,”EPJ Web Conf. 168 (2018) 01011
DOI: 10.1051/epjconf/201816801011
- Aftab Ahmad, Naser Ahmadinia, Olindo Corradini, Sang Pyo Kim, Christian Schubert, “Multiphoton amplitude in a constant background field,”EPJ Web Conf. 168 (2018) 04003
DOI: 10.1051/epjconf/201816804003
- Je-An Gu, Sang Pyo Kim, Che-Min Shen, “Quantum Gravity Effects in Cosmology,” EPJ Web Conf. 168 (2018) 03001
DOI: 10.1051/epjconf/201816803001
- Aftab Ahmad, Naser Ahmadinia, Olindo Corradini, Sang Pyo Kim, Christian Schubert, “Master formulas for the dressed scalar propagator in a constant field,”Nucl.Phys. B919 (2017) 9-24
DOI: 10.1016/j.nuclphysb.2017.03.007

Curriculum Vitae of Song Doo Jong

Family Name : SONG

Given Name : DOO JONG

Date of Birth : September 15, 1949

Sex : male

Place of Birth : Hapchun, Kyungsangnamdo, Republic of Korea

Address: 128-1504, Hanbit Apartment, Eueung-dong Youseing-gu
Daejeon, Republic of Korea

1970 - 1977 : Physics Department, Sogang University (B.S.)

1971 - 1973 : Regular Army Service

1977 - 1979 : Graduate School, Sogang University (M.S)

1980 - 1983 : Researcher of Physics Department, University of Rome -
"La Sapienza"

1983 - 1987 : Corso di "Dottorato di Ricerca", University of Rome -
"La Sapienza" (Doottorato di Ricerca)

1987 - 1987 5 : Visiting Physicist, Fermi National Accelerator
Laboratory

1987.9 - 1987.12 : Lecturer, Sogang University

1988 - 1997 : Senior Researcher, Institute of Space Science and
Astronomy

1997 - 2010 :Principal Researcher, Korea Astronomy and Space Science
Institute

Publications

– Journal Articles

- (1) R. Ruffini, D.J. Song & L. Stella, *A&A*, 103, L7 (1981)
"On Some Possible Additional Relativistic Effects in SS433"
- (2) R. Ruffini, D.J. Song & L. Stella, *A&A*, 142, 129 (1983)
"On the Statistical Distribution of Massive Fermions and Bosons
in a Friedmann Model"
- (3) R. Ruffini & D.J. Song, *Astrophys. Space Science*, 99, 319 (1984)
"Nutational Effects in SS433"
- (4) R. Cogotti, R. Ruffini & D.J. Song, *A&A*, 142, 124 (1985)
"Theoretical Interpretation of the Nutational Effects in SS433"
- (5) R. Ruffini & D.J. Song, *Astrophys. Space Science*, 110, 89 (1985)
"De Media Aequinoctiorum Praecessione atque De Nutatione
Stellare SS433"
- (6) R. Ruffini & D.J. Song, *A&A*, 179, 3 (1987)
"Cosmological Constraints of 'Inos' Composing Galactic Haloes"
- (7) H.C. Ohanian, R. Ruffini & D.J. Song, *Nuovo Cimento*, 99B, 45
(1987)
"Properties of a Cosmological Gas of Bosons"
- (8) R. Ruffini, D.J. Song & S. Taraglio, *A&A*, 190, 1 (1988)
"The 'Ino' Mass and the Cellular Large Scale Structure of the
Universe"
- (9) R. Ruffini, D.J. Song & W.R. Stoeger, *Nuovo Cimento*, 102B, 159 (1988)
"Detachment of Supercluster from the Hubble flow and Their

Fragmentation into Galaxies"

- (10) R. Ruffini, D.J. Song & S. Taraglio, A&A, 232, 7 (1990)
"The Framentation of Supercluster and Large Scale Structure of the Universe"
- (11) D.J. Song, Nuovo Cimento, 105B, 921, (1990)
"Large Scale Bulk Motion and Dark Matter"
- (12) D. J. Song, JKPS, 25, S302, (1992)
"On the Limits of Lepton Numbers by Cosmological Rate Equation"
- (13) D.J. Song, Nuovo Cimento, 112B, 517 (1997)
"The Fifth Force and Neutron Star Structure Revisited"
- (14) H. W. Lee & D. J. Song, Nuovo Cimento, 112B, 395 (1997)
"Effect of neutrino oscillation on primordial nucleosynthesis"
- (15) D. J. Song, JKPS, 33, S565, (1998)
"Light propagation in a spherically symmetric dust universe"
- (16) D. J. Song, Nuovo Cimento 115 B, 1025, (2000)
"Null Geodesics in perturbed Bianchi type-I spacetime"
- (17) D. J. Song, JKPS, 16, 7 (2003)
"Sachs-Wolfe effect in anisotropic spacetime"
- (18) Seoktae, Koh, S. P. Kim & D. J. Song, JHEP 12 (2004) 060
"Gravitational wave spectrum in inflation with nonclassical states"
- (19) Hyesung Kang, Dongsu Ryu, R. Cen & D. J. Song, ApJ, 620, 21 (2005)
"Shock-Heated Gas in the Large-scale Structure of the Universe"
- (20) Seoktae, Koh, S. P. Kim & D. J. Song, PRD 71, 123511, (2005)
"Nonlinear evolutions and non-Gaussianity in generalized gravity"
- (21) Seoktae, Koh, S. P. Kim & D. J. Song, PRD 721, 043523, (2005)

“Inflationary solutions in the nonminimally coupled scalar-field theory”

– Proceeding Articles

- (1) R. Ruffini & D.J. Song, 1986.
“On the Constraints of the Properties of ‘Inos’ Composing Galactic Haloes” in Proc. of the 4th Marcel Grossmann Meeting on “General Relativity”. etd. R. Ruffini
- (2) R. Ruffini & D.J. Song, 1986.
“On the Jeans mass of weakly interacting neutral massive leptons” in Proc. of the LXXVI Course of International Summer School on “Gamov Cosmology”. ed. F. Melchiorri and R. Ruffini
- (3) R. Ruffini, D.J. Song & S. Taraglio, 1987.
“The neutrino mass and the cellular large scale structure of the universe” in Proc. of IAU Symposium #124 on “Observational Cosmology”. ed. A. Hewitt et al.
- (4) R. Ruffini & D.J. Song, 1987.
“Determinational of ‘Inos’ masses composing galactic haloes” in Proc. of IAU Symposium #124 on “Observational Cosmology”. ed. A. Hewitt et al.
- (5) R. Ruffini, D.J. Song & W.R. Stoeger, 1988.
“Detachment of Supercluster from the Hubble Flow and their Fragmentation into Galaxies” in Proc. of the First Korean-Italian Symposium on “Relativistic Astrophysics”, ed. Y.D. Kim, C.H. Lee and R. Ruffini.
- (6) R. Ruffini & D.J. Song, 1988.
“The Jeans Instability and the Formation of Structure of the Universe” in Proc. of the First Korean-Italian Symposium on “Relativistic Astrophysics”, ed. Y.D. Kim, C.H. Lee and R. Ruffini.
- (7) Y.S. Ahn, Y.H. Tang, H.J. Sim, B.S. Han & D.J. Song, 2002/7
“The date conversion table for the Luni-Solar Calendar and Julian Calendars during the Koryo Dynasty (AD 918 – 1392) in Korea.” Historical Perspectives on East Asian Science, Technology and Medicine, ed by A.L. Chan, G. K. Clancy and H.-C. Loy, Singapore Univ. Press, p438.

Starobinsky Alexei

Position: Principal Research Scientist
Period covered: 2017



I Scientific Work

II Conferences and educational activities

II a Conferences and Other External Scientific Work

II b Work With Students

II c Diploma thesis supervision

II d Other Teaching Duties

II e. Work With Postdocs

III. Service activities [*activities carried out in collaboration with ICRANet (e.g. teaching activities, conferences etc...) and outside ICRANet (teaching activities in your university etc...)*]

III a. Within ICRANet

III b. Outside ICRANet

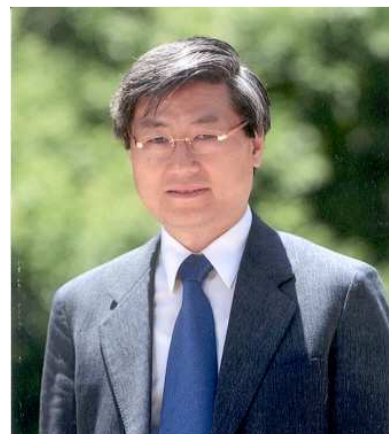
IV. Other

2017 List of Publication

1. H. Motohashi, A. A. Starobinsky, Constant-roll inflation: confrontation with recent observational data, *Europhys. Lett.* 117, No. 3, 39001 (2017); arXiv:1702.05847 [astro-ph.CO].
2. H. Motohashi, A. A. Starobinsky, $f(R)$ constant-roll inflation, *Eur. Phys. J. C* 77, 538 (2017); arXiv:1704.08188 [astro-ph.CO].
3. C.-Q. Geng, C. C. Lee, M. Sami, E. N. Saridakis, A. A. Starobinsky, Observational constraints on successful models of quintessential inflation, *J. Cosm. Astropart. Phys.* 1706, 011 (2017); arXiv:1705.01329 [gr-qc].
4. A. H. Guth *et al.* (including A. A. Starobinsky), A cosmic controversy, *Scientific American* 317, 5-7 (2017).

Kim Sung-Won

Position: Professor in Ewha Womans University, Seoul, Korea
Period covered: Since 1985



I. Scientific Work

2010 List of Publications

1. Sung-Won Kim, Zerilli-type Perturbation of Traversable Wormhole, Journal of the Korean Physical Society, Vol. 56, No. 5, May 2010, pp. 1644-1648.
2. Sung-Won Kim, Dark Energy Accretion onto a General Wormhole in the Friedmann- Robertson- Walker Universe, Journal of the Korean Physical Society, Vol. 57, No. 3, September 2010, pp. 660-663.
3. Soon-Tae Hong and Sung-Won Kim, Hydrodynamics and Global Embeddings of Taub-NUT Spacetime, Journal of the Korean Physical Society, Vol. 56, No. 5, May 2010, pp. 1633-1637.
4. Sung-Won Kim and Wan-Seon Kim, Study for the Leadership Qualities of International WYP 2005 Young Physics Talent, New Physics: Sae Mulli , Volume 60, Number 9, 2010 , pp. 952-959.
5. Miyoung Cho, Kongju Mun, and Sung-Won Kim, The Development and Application of evaluating Standards for Creative Problem Solving Items, The Journal of Curriculum and Evaluation, 2010, Vol. 13, No. 2, pp. 309 ~ 333.
6. Sung-Youn Choi, Sung-Won Kim, An Exploration of the Influencing Factors and Development of Effective Models of Science Teacher Efficiency, J Korea Assoc. Sci. Edu, Vol. 30, No. 6, pp. 693-718(2010. 10)
7. Miyoung Cho, Jiyoung Jang, Jungsook Yoo, Sung-Won Kim, and Hyunju Lee, Analysis of questioning used in science classes based on teaching and learning purposes and processes: Two case studies, J. of Learner-Centered Curriculum and Instruction, Vol. 10, No. 2, pp. 408-428 (2010).

II. Conferences and educational activities

II a. Conferences and Other External Scientific Works

1. Korean Physical Society Spring Meeting, April 20, 2010, Daejeon, Korea.
2. Korean Physical Society Fall Meeting, October 20-22, 2010, Pyeongchang, Korea.
3. Classical and Quantum Cosmology Workshop, May 7 – June 5, 2010, Kyoto, Japan.
4. 2nd Galilei-Xu Guanqi Meeting, July 14 -17, Ventimiglia, Italy.
5. 2010 NARST Meeting, April 21-24, Philadelphia, PA, USA.
6. 2010 Petrov Anniversary Meeting on GRG, Nov. 1- 6, Kazan, Russia.

II b. Work With Students

Research on Physics (Astrophysics) and Science Education

II c. Diploma thesis supervision

3 Master Degree Students 1 PhD Student

II d. Other Teaching Duties

Sabbatical Year

II e. Work With Postdocs

Work on Science Education with 2 Postdocs.

III. Service activities

Outside ICRANet

1. Chair of Korean Physics Olympiad Committee (KPS)
2. President of Korean Society for School Science (KOSSS)

Wiltshire, David L.

Position: Professor, Department of Physics & Astronomy, University of Canterbury, Christchurch, New Zealand

Period at ICRANet: 29 July 2008 – 30 October 2008



I Scientific Work

Inhomogeneous Cosmology, Backreaction, the Averaging Problem in General Relativity.

II Conferences and educational activities

II a Conferences and Other External Scientific Work, presented talks at:

- *Inhomogeneous Cosmologies Workshop, Torun, Poland, 2-7 July, 2017*
- *New Zealand Institute of Physics Conference 2017, Dunedin, NZ, 10-12 July, 2017*
- *ACGRG9: 9th Australasian Conference on General Relativity and Gravitation, Gingin, Western Australia, 26-30 November, 2017*
- *ARTHUS Roundtable Workshop 1 on Inhomogeneous Cosmology, Lyon, France, 4-8 December, 2017*

II b Student supervision: Supervised 2 PhD students – *Yongzhuang Li, Asta Heinesen*

II d Other Teaching Duties – Gave two lecture courses at University of Canterbury: *PHYS203 Quantum Physics*; *PHYS415 General Relativity*.

III. Service activities *III b. Outside ICRANet*: Inhomogeneous Cosmologies Workshop Organizing Committee; Editorial Board of *Classical and Quantum Gravity*; Academic Board at the University of Canterbury; Council of NZ Institute of Physics – Elected President July, 2017; International Society on General Relativity and Gravitation Committee; ACGRG9 Scientific Organizing Committee.

IV. Other activities Sabbatical March-July 2017. Presented seminars at *Ecole Normale Supérieure de Lyon, France*, 12/5/2017; *APC, Université Paris Diderot*, 6/6/2017; *Charles University, Prague, Czech Republic* 23/6/2017

2017 List of Publications

- A.A. Coley and D.L. Wiltshire, "*What is general relativity?*", Physica Scripta D **92** (2017) 053001 [10pp]
- A.A. Coley and D.L. Wiltshire, "*Can we ditch dark energy by better understanding general relativity?*", The Conversation, 29 June 2017 (reprinted in Newsweek, Huffington Post etc)
- L.H. Dam, A. Heinesen and D.L. Wiltshire, "*Apparent cosmic acceleration from type Ia supernovae*", Mon. Not. R. Astron. Soc. **472** (2017) 835–851.

Research Scientists

ARGÜELLES CARLOS RAÚL

Position:

Assistant Professor of Theoretical Physics

Faculty of Exact Sciences, La Plata National University

Researcher, Theoretical Physics Area

National Research Council of Science & Technology
(CONICET)

Faculty of Astronomical and Geophysical Sciences

Paseo del Bosque s/n, B1900FWA La Plata, Buenos Aires

Tel: 005402214236593-109

charly@carina.fcaglp.unlp.edu.ar



Period covered: 2016 -

I Scientific Work

Research in theoretical and phenomenological aspects of particle Dark Matter, Galactic dynamics, Cosmology, Physics beyond standard model, General Relativity, Modified gravity, compact objects, Black Hole Physics.

II Conferences and educational activities

II a Conferences and Other External Scientific Work

Public conference on National TV in the topic: 'porque se expande el Universo?', TV pública, Argentina, December 6, 2017

Assistance to the 5th International Workshop for the design of the ANDES underground Laboratory, Buenos Aires, Argentina, June 29-30, 2017

Assistance to School on Dark matter at ICTP-SAIFR/IFT-UNESP, Sao Paulo, Brazil, June-July 2016

Invited talk at Supernovae, Hypernovae and Binary driven Hypernovae – An adriatic Workshop, Pescara, Italy, June 20 –30 2016

Invited talk at the Gravitational Waves, Cosmology and Compact Objects workshop, La Plata, Argentina, March 8 –9 2016

II b Work With Students

Master in Science Thesis supervisor.

- i) Graduate Student: Manuel Díaz - University of Buenos Aires (UBA). Issue: Dark Matter and structure formation

Benetti Micol

Position: Post- doctoral in the National
Observatory of Rio de Janeiro
Period covered: 15/8/2014 - now



I Scientific Work

In the past year I started to work in the National Observatory of Rio de Janeiro. I was principally interested in implement the galaxy data (e.g the SDSS - data release 11) in the Cosmomc code, in order to use them in cosmology analyses. I also continue my Phd topic on constraining inflationary models, starting collaborations with the Prof. Rudnei Ramos (UERJ - Universidade do Estado do Rio de Janeiro) and the Prof. Susana Landau (IFIBA-Instituto de Física de Buenos Aires). I was also involved in two collaboration. First, with G. C. Carvalho, on the Baryon Acoustic Oscillations analysis; we submitted the work in PRD journal. Then, with C. Novaes, on primordial Non-Gaussianities signal; we submitted the work in JCAP journal. Finally, I participated at several conference, presenting our results.

II Conferences and educational activities

II a Conferences and Other External Scientific Work

Presented talk in XIVth Marcel Grossmann Meeting - International meeting, July 12-18 2015, Rome, Italy

Presented talk in Meeting on Fundamental Cosmology - International meeting, June 17-19 2015, Santander, Spain

Presented talk in VIth Workshop Challenges Of New Physics In Space - International meeting, May 24-29 2015, Campos do Jordao, SP, Brazil

Presented talk in 2nd Cesar Lattes Meeting - International ICRAnet meeting, Apr 13-18 2015, Rio de Janeiro, RJ, Brazil

Presented talk in 10th J-PAS Collaboration Meeting - International J-PAS meeting, Feb 9-13 2015, Paraty, RJ, Brazil

Participating in School of Theory of cosmological perturbations - Ph.D School, Nov 12-14 2014, Rio de Janeiro, RJ, Brazil

Participating in XIXth Cycle of Special Courses (CCE) - Ph.D School, Nov 3-7 2014, Rio de Janeiro, RJ, Brazil

Presented talk in Theory Miniworkshop J-PAS collaboration - National J-PAS meeting, Oct 15 2014, Rio de Janeiro, RJ, Brazil

Participating in Ist School of Statistical Methods in Physics - Ph.D School, Oct 6-10 2014, Goiania, GO, Brazil

II b Work With Students

II c Diploma thesis supervision

II d Other Teaching Duties

Lesson for graduates in the cycle courses “Escola de inverno 2015”. Location: Observatorio Nacional.
Topic: The Early Universe.

Mini course for PhD and Post-PhD. Location: Observatorio Nacional. Topic: The CAMB code.

II e. Work With Postdocs

III. Service activities [*activities carried out in collaboration with ICRANet (e.g. teaching activities, conferences etc...) and outside ICRANet (teaching activities in your university etc...)*]

III a. Within ICRANet

Presented talk in XIVth Marcel Grossmann Meeting - International meeting, July 12-18 2015, Rome, Italy

Presented talk in 2nd Cesar Lattes Meeting - International ICRANet meeting, Apr 13-18 2015, Rio de Janeiro, RJ, Brazil

III b. Outside ICRANet

Lesson for graduates in the cycle courses “Escola de inverno 2015”. Location: Observatorio Nacional.
Topic: The Early Universe.

Mini course for PhD and Post-PhD. Location: Observatorio Nacional. Topic: The CAMB code.

IV. Other

Affiliations:

J-PAS collaboration, Javalambre-Physics of the Accelerated Universe Astrophysical Survey.

SDSS IV collaboration, Sloan Digital Sky Survey.

2014 List of Publication

“Primordial Non-Gaussianities of inflationary step like models” Camila P. Novaes, M. Benetti, A. Bernui (arXiv:1507.01657. Submitted in JCAP - Journal of Cosmology and Astroparticle Physics)

”Baryon Acoustic Oscillations from the SDSS DR10 galaxies angular correlation function” G. C. Carvalho, A. Bernui, M. Benetti, J. C. Carvalho, J. S. Alcaniz (arXiv:1507.08972. Submitted in Phys. Rev. D)

- ii) Graduate Student: Rafael Yunis – University of Buenos Aires (UBA). Issue: Dark matter Indirect detection

II c Diploma thesis supervision

Ph.D. advisor

Ph.D. Student: Andreas Krut. Thesis: Dark matter and galactic structures. Institution: ICRANet-Erasmus Mundus Joint Doctorate (fifth cycle) Period covered: (2014-). Director: Prof. Dr. R. Ruffini

II d Other Teaching Duties

Assistant Professor position in Quantum field theory at La Plata National University (Exact Sciences Faculty)

II e. Work With Postdocs

III. Service activities [*activities carried out in collaboration with ICRANet (e.g. teaching activities, conferences etc...) and outside ICRANet (teaching activities in your university etc...)*]

III a. Within ICRANet

Scientific collaborator; Ph.D co-advisor; Meeting conferences.

III b. Outside ICRANet

Researcher position at CONICET – Argentina. Working place: FCAGLP - UNLP, La Plata, Argentina. Paseo del Bosque, Casco Urbano, B1900FWA La Plata, Buenos Aires. Phone: +54 0221 4236593 Int. 1052. Teaching activities as Assistant Professor at UNLP.

IV. Other

2017 List of Publication

- [1] C. R. Argüelles, A. Krut, J. A. Rueda, and R. Ruffini, 'Novel constraints on fermionic dark matter from galactic observables', MNRAS, submitted (2017), arXiv:1606.07040[v2]
- [2] N. E. Mavromatos, C. R. Argüelles, R. Ruffini, and J. A. Rueda, 'Self-interacting dark matter', IJMPD, Volume 26, Issue 3, id. 1730007 (2017), doi: 10.1142/S0218271817300075

Bernardini Maria Grazia



Position: Postdoctoral Research Fellow

Period covered: 2012

I Scientific Work

I mainly worked on the analysis and interpretation of the observational data of the Swift/X-Ray Telescope (XRT; 0.3-10 keV) and of the Burst Alert Telescope (BAT; 15-150 keV). I was involved in the analysis of all the Swift/XRT GRB observations until December 2010, with the morphological and spectral characterisation of the X-ray light curves (Margutti et al., 2012). The entire data set and analysis will be soon available online for further investigations and for a direct comparison with theoretical models. One of the major outcomes of the X-ray analysis is the identification on a new three-parameter correlation involving X-ray late time and gamma-ray prompt emission parameters, shared by both short and long GRBs (Bernardini et al., 2012). The physical origin of this correlation lies in what is common to the two classes, and likely independent of the progenitors and environment since both are thought to be different. We speculate that the ultimate physical parameter that regulates the GRB properties is the outflow Lorentz factor. Currently I am also working on the XMM Serendipitous Source Catalog (2XMMi-DR3) to develop algorithms able to identify transient emissions among the XMM detections that can be associated either to orphan GRB afterglows or to Supernova shock breakout.

II Conferences and educational activities

II a Conferences and Other External Scientific Work

- “Lampi su Napoli, III congresso nazionale sui GRB”, Napoli (Italy), September 20-22, 2012.
- “XIII Marcel Grossmann Meeting on General Relativity”, Stockholm (Sweden), July 1-7, 2012.
- “Gamma-Ray Bursts 2012 Conference”, Munich (Germany), May 7-11, 2012.

II b Work With Students

- Co-supervisor of the Ph.D. student Elena Zaninoni at University of Padova, Padova (Italy), January 2010 – December 2012.

II c Other Teaching Duties

- Lecturer for the IRAP Ph.D. school: “The prompt-afterglow connection: a universal scaling for short and long GRBs”, Nice (France), September 2012.

Boshkayev Kuantay

Position: Associate Professor

Period covered: July 9- August 25, 2017



I Scientific Work

General Relativity, Relativistic Astrophysics and Compact objects

II Conferences and educational activities

1 Boshkayev K. I-Love-Q relations in White Dwarf Stars. Integration of Belarusian scientists in the research programs of the world's leading nuclear physics centers ICRANet-Minsk Workshop April 26-28, 2017, Minsk, Belarus.

2 Boshkayev K. Main parameters of neutron stars from QPOs in LMXBs. Seminar in Institute of Theoretical Physics, Faculty of Mathematics and Physics, Charles University, Prague, July 7, 2017

III. Service activities

III a. Within ICRANet

Collaboration with prof. Remo Ruffini, Dr. Jorge Rueda and Dr. Marco Muccino.

III b. Outside ICRANet

Delivering lectures in Theoretical Physics, Faculty of Physics and Technology of Kazakh National University, Almaty, Kazakhstan.

2017 List of Publication

1. Takibayev N., Boshkayev K. Neutron Stars, Physics, Properties and Dynamics. New-York «Nova Science Publishers, Inc», 2017.- 288 pages. ISBN 9781536105070

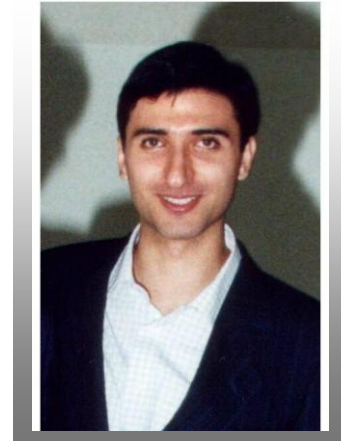
2. Boshkayev K., Quevedo H., Zhami B. I -Love- Q relations for white dwarf stars // Monthly Notices of the Royal Astronomical Society, Volume 464, Issue 4, p.4349-4359 (2017).

3. Muccino M., Boshkayev K. Physical insight into the Combo-relation // Monthly Notices of the Royal Astronomical Society.- Vol. 468. – P. 570-576 (2017).
4. Abishev, M.E., Boshkayev, K.A., Ivashchuk, V.D. Dilatonic dyon-like black hole solutions in the model with two Abelian gauge fields // European Physical Journal C, Vol. 77, p. 180 (2017).
5. Boshkayev K, Rueda J.A., Muccino M. Main parameters of neutron stars from quasi-periodic oscillations in low mass X-ray binaries // Proceedings of the 14th Marcel Grossmann Meeting. – 2017. – P. 3433-3440.
6. Boshkayev K, Rueda J.A., Ruffini R., Zhami B. Induced compression of white dwarfs by angular momentum loss // Proceedings of the 14th Marcel Grossmann Meeting. – 2017. – P. 4379-4384.
7. Boshkayev K, Rueda J.A., Ruffini R., Zhami B., Kalymova Zh., Balgimbekov G. Mass-radius relations of white dwarfs at finite temperatures // Proceedings of the 14th Marcel Grossmann Meeting. – 2017. – P. 4287-4290.

Geralico Andrea

Position: Postdoc

Period covered: October 1st, 2006 – present



I Scientific Work

- 1 $3+1$ splitting of spacetime: measurement processes and the role of observers in general relativity;
- 2 test particle dynamics in black hole spacetimes; motion of small extended bodies (neutral or charged test particle endowed with an internal structure described by its spin and quadrupole moment);
- 3 general relativistic perturbation theory of Einstein-Maxwell systems;
- 4 exact solutions of Einstein's field equations;
- 5 gravitational lensing techniques in strong gravitational fields;

II Conferences and educational activities

II b Work With Students

Daniele Gregoris, Maria Haney and Jonas P. Pereira (IRAP Ph. D. students)

II e. Work With Postdocs

Eduardo Bittencourt (CAPES)

2014 List of Publications

- 1) Bini D., de Felice F. and Geralico A.,
Observer-dependent optical properties of stationary axisymmetric spacetimes,
International Journal of Geometric Methods in Modern Physics, vol. 11, 1450024, 2014.
- 2) Bini D., Geralico A. and Haney M.,
Refraction index analysis of light propagation in a colliding gravitational wave spacetime,
General Relativity and Gravitation, vol. 46, 1644, 2014.

- 3) Bini D. and Geralico A.,
Deviation of quadrupolar bodies from geodesic motion in a Kerr spacetime,
Physical Review D, vol. 89, 044013, 2014.
- 4) Bini D. and Geralico A.,
Extended bodies in a Kerr spacetime: exploring the role of a general quadrupole tensor,
Classical and Quantum Gravity, vol. 31, 075024, 2014.
- 5) Bini D., Geralico A., Haney M. and Ortolan A.,
Deviation effects induced by strong electromagnetic waves,
Physical Review D, vol. 89, 044013, 2014.
- 6) Bini D., Geralico A., Gregoris D. and Succi S.,
Scalar field inflation and Shan-Chen fluid models,
Physical Review D, vol. 90, 044021, 2014.
- 7) Bini D., Geralico A., Jantzen R. T. and Semerak O.,
Particles under radiation thrust in Schwarzschild space-time: a flux perpendicular to the equatorial plane,
MNRAS, 2014 (to appear).
- 8) Bini D., Geralico A. and Passamonti A.,
Radiation drag in the field of a non-spherical source,
MNRAS, 2014 (to appear).
- 9) Bini D. and Geralico A.,
Tidal invariants along the world line of an extended body in the Kerr spacetime,
Classical and Quantum Gravity, 2014 (submitted).

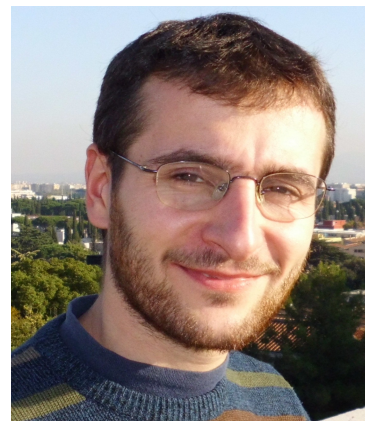
Marco Muccino

Position: PhD

Period covered: 2010/2014

Position: Post-Doc

Period covered: 2014/2016



I. Scientific Work

My research area includes:

- data reduction of GRBs, from Swift-BAT and XRT, Fermi-GBM and LAT and BATSE by using XSPEC, RMFIT, and the Swift-BAT and XRT pipelines to create spectra and light curves;
- analysis and classification of short GRBs and quest of related progenitor systems as neutron star–neutron star (NS–NS) or NS–white dwarf (WD) mergers in the contest of the Fireshell model;
- analysis and classification of long GRBs and application of the "Induced gravitational collapse" (IGC) model, proposed to explain the GRBs-supernovae (SNe) connection;
- analysis of the X-ray afterglow of long and short GRBs;
- analysis of the high energy spectral component of short and long GRBs;
- cosmology with GRBs.

II. Conferences and educational activities

II a. Conferences:

- 1) IRAP Ph.D. Erasmus Mundus Workshop “Recent News from the MeV, GeV and TeV Gamma-Ray Domains”, March 21st – 26th, 2011 Pescara (Italy)
- 2) IRAP Ph.D. Erasmus Mundus school, May 25th – June 10th, 2011 Nice (France)
- 3) HEPRO (High Energy Phenomena in Relativistic Outflows) III, June 27th – July 1st, 2011 Barcelona (Spain)
- 4) 12th Italian-Korean Symposium on Relativistic Astrophysics, July 4th–8th, 2011 Pescara (Italy)
- 5) IRAP Ph Erasmus Mundus School, September 5th–16th, 2011 Nice (France)
- 6) IRAP Ph.D. Erasmus Mundus Workshop, “Gamma Ray Bursts, their progenitors and the role of thermal emission”, October 2nd–7th, 2011 Les Houches (France)
- 7) Third Galileo - Xu Guangqi meeting, “THE SUN, THE STARS, THE UNIVERSE and GENERAL RELATIVITY”, October 11th– 15th, 2011 Beijing (China)
- 8) 9th AGILE Science Workshop, Astrophysics with AGILE: Five Years of Surprises, April 16th–17th, 2012 ESA-ESRIN, Frascati (Italy)
- 9) Thirteenth Marcel Grossmann Meeting (MG 13), “On Recent Developments on Theoretical and Experimental General Relativity, Astrophysics and Relativistic Field Theories”, July 1st– 7th, 2012 Stockholm (Sweden)
- 10) IRAP Ph.D. Erasmus Mundus School, September 3rd – 21st, 2012 Nice (France)

- 11) IRAP Ph.D. Erasmus Mundus School, May 16th – 31st, 2013 Nice (France).
- 12) 13th Italian-Korean Meeting on Relativistic Astrophysics, July 15th – 19th, 2013 Seoul (Korea).
- 13) IRAP Ph.D. Erasmus Mundus school, September 2nd – 20th, 2013 Nice (France).
- 14) XI International Conference on Gravitation, Astrophysics and Cosmology of Asia-Pacific Countries (ICGAC XI), October 1st – 5th, 2013 Almaty (Kazakhstan).
- 15) The 27th Texas Symposium on Relativistic Astrophysics, December 8th – 13th, 2013 Dallas (Texas, USA).
- 16) IRAP Ph.D. Erasmus Mundus School, February 23th – March 2nd, 2014 Nice (France).
- 17) Zeldovich-100 Meeting, “Subatomic particles, Nucleons, Atoms, Universe: Processes and Structure”, March 10th – 14th, 2014 Minsk (Belarus).
- 18) IRAP Ph.D. Erasmus Mundus Workshop, “Supernovae, Gamma-ray bursts and the induced gravitational collapse”, May 11th – 16th, 2014 Les Houches (France).
- 19) 1st Scientific ICRANet Meeting in Armenia, “Black Holes: the largest energy sources in the Universe”, June 30th – 4th July 2014 Yerevan (Armenia)
- 20) IRAP Ph.D. Erasmus Mundus school, September 8th – 19th, 2014 Nice (France).
- 21) The 2nd ICRANet Cesar Lattes Meeting, April 13th – 18th, 2015 Niteroi – Rio De Janeiro (Brazil).
- 22) Fourteenth Marcel Grossmann Meeting - MG14, July 12th – 18th, Rome (Italy).
- 23) 14th Italian-Korean Symposium on Relativistic Astrophysics", July 20th – 24th, Pescara (Italy)
- 24) “Supernovae, Hypernovae and Binary Driven Hypernovae”, An Adriatic Workshop, June 20th – 30th, Pescara (Italy)

II b. Work With Students:

Internal seminars and supervision of data analysis with the IRAP-PhD students.

III. Service activities

III a. Within ICRANet

- 1) *Lecture: IRAP Ph.D. Erasmus Mundus School, September 5th - 16th, 2011 Nice (France)*
“High Energy emission in GRBs: the case of GRB 090902B”
- 2) *Lecture: IRAP Ph.D. Erasmus Mundus School, September 3rd - 21st, 2012 Nice (France)*
“GRB090227B: the missing link between genuine short and long GRBs”

- 3) *Lecture: IRAP Ph.D. Erasmus Mundus School, May 16th-31st, 2013 Nice (France)*
“GRB 090510: A Disguised Short Gamma-Ray Burst with the Highest Lorentz Factor and Circumburst Medium”
- 4) *Lecture: IRAP Ph.D. Erasmus Mundus School, September 2nd–20th, 2013 Nice (France)*
“Data analysis of GRBs in the Fermi era”
- 5) *Lecture: IRAP Ph.D. Erasmus Mundus Winter School, February 23th–March 2nd, 2014 Nice (France)* *“On the Binary Driven Hypernovae and their nested X-ray afterglows”*
- 6) *Lectures: IRAP Ph.D. Erasmus Mundus school, September 8th–19th, 2014 Nice (France)*
 - a) *“Generalities of GRBs and short GRBs in the fireshell model”,*
 - b) *“The binary-driven hypernovae”*
- 7) *Lectures: IRAP Ph.D. Erasmus Mundus school, May 30th–June 2nd, 2016 Nice (France)*
“Classification of long and short bursts and their rate of occurrence”

III b. Outside ICRANet

December 2014. Set of lectures in Almaty (Kazakhstan) on GRBs for graduated and under-graduated students.

December 2015. Collaboration with Dr. Kuantay Boshkayev in Almaty (Kazakhstan).

February – September 2016. Collaboration with Dr. Luca Izzo.

IV. List of Publications, 2014–2016

- 1) *“Evidence for a proto-black hole and a double astrophysical component in GRB 101023”, A&A, 538, A58 (2012). A.V. Penacchioni, R. Ruffini, L. Izzo, M. Muccino, C.L. Bianco, L. Caito, B. Patricelli, L. Amati.*
- 2) *“GRB 090227B: the missing link between the genuine short and disguised short GRBs”, ApJ 763, 125 (2013); M. Muccino; R. Ruffini; C.L. Bianco; L. Izzo; A.V. Penacchioni.*
- 3) *“GRB 110709B in the induced gravitational collapse (IGC) paradigm”, A&A, 551, A133 (2013); A.V. Penacchioni, R. Ruffini, C.L. Bianco, L. Izzo, M. Muccino, G.B. Pisani, J. A. Rueda.*
- 4) *“On a novel distance indicator for Gamma-Ray Bursts associated with Supernovae”, A&A, 52L, 5 (2013); G.B. Pisani, L. Izzo, R. Ruffini, C.L. Bianco, M. Muccino, A.V. Penacchioni, J. A. Rueda, Y. Wang.*
- 5) *“GRB 090510: A Disguised Short Gamma-Ray Burst with the Highest Lorentz Factor and*

- Circumburst Medium*”, *ApJ*, 772, 62 (2013); M. Muccino, R. Ruffini, C.L. Bianco, L. Izzo, A.V. Penacchioni, G.B. Pisani.
- 6) “On binary-driven hypernovae and their nested late X-ray emission”, *A&A*, 565, L10 (2014); R. Ruffini, M. Muccino, C. L. Bianco, M. Enderli, L. Izzo, M. Kovacevic, A. V. Penacchioni, G. B. Pisani, J. A. Rueda, Y. Wang.
 - 7) “Induced gravitational collapse at extreme cosmological distances: the case of GRB 090423”, *A&A*, 569, A39, (2014); R. Ruffini, L. Izzo, M. Muccino, G. B. Pisani, J. A. Rueda, Y. Wang, C. Barbarino, C. L. Bianco, M. Enderli, M. Kovacevic.
 - 8) “A search for Fermi bursts associated with supernovae and their frequency of occurrence”, *A&A*, 569, A108 (2014); M. Kovacevic, L. Izzo, Y. Wang, M. Muccino, M. Della Valle, L. Amati, C. Barbarino, M. Enderli, G. B. Pisani, L. Li.
 - 9) “GRB 130427A and SN 2013cq: A Multi-wavelength Analysis of An Induced Gravitational Collapse Event”, *ApJ*, 798, 10 (2015); R. Ruffini, Y. Wang, M. Kovacevic, C. L. Bianco, M. Enderli, M. Muccino, A. V. Penacchioni, G. B. Pisani, J. A. Rueda.
 - 10) “Extracting multipole moments of neutron stars from quasi-periodic oscillations in low mass X-ray binaries”, *Astronomy Reports*, 59, 441 (2015); K. Boshkayev, J.A. Rueda, M. Muccino.
 - 11) “On binary driven hypernovae and their nested late X-ray emission”, *Astronomy Reports*, 59, 581 (2015); M. Muccino, R. Ruffini, C. L. Bianco, M. Enderli, M. Kovacevic, L. Izzo, A. V. Penacchioni, G. B. Pisani, J. A. Rueda, Y. Wang.
 - 12) “Induced gravitational collapse in the BATSE era: The case of GRB 970828”, *Astronomy Reports*, 59, 626 (2015); R. Ruffini, L. Izzo, C. L. Bianco, J. A. Rueda, C. Barbarino, H. Dereli, M. Enderli, M. Muccino, A. V. Penacchioni, G. B. Pisani, Y. Wang.
 - 13) “Predicting supernova associated to gamma-ray burst 130427a”, *Astronomy Reports*, 59, 667 (2015); Y. Wang, R. Ruffini, K. Kovacevic, C. L. Bianco, M. Enderli, M. Muccino, A. V. Penacchioni, G. B. Pisani, J. A. Rueda.
 - 14) “GRB 140619B: a short GRB from a binary neutron star merger leading to black hole formation”, *ApJ*, 808, 190 (2015); R. Ruffini, M. Muccino, M. Kovacevic, F. G. Oliveira, J. A. Rueda, C. L. Bianco, M. Enderli, A. V. Penacchioni, G. B. Pisani, Y. Wang, E. Zaninoni.
 - 15) “New measurements of Ω_m from gamma-ray bursts”, *A&A*, 582, A115 (2015); L. Izzo, M. Muccino, E. Zaninoni, L. Amati, M. Della Valle.
 - 16) “On the occurrence rate of short and long GRBs”, *ApJ* (in press), *arXiv:1602.02732* (2016); R. Ruffini, J. A. Rueda, M. Muccino, L. M. Becerra, G. B. Pisani, M. Kovacevic, Y. Wang, Y. Aimuratov, C. L. Bianco, R. Moradi, F. G. Oliveira.
 - 17) “GRB 090510: a genuine short GRB from a binary neutron star coalescing into a Kerr-Newman black hole”, *ApJ* (in press), *arXiv:1607.02400* (2016); R. Ruffini, M. Muccino,

*Y. Aimuratov, C. L. Bianco, C. Cherubini, M. Enderli, M. Kovacevic, R. Moradi,
A. V. Penacchioni, G. B. Pisani, J. A. Rueda, Y. Wang.*

18) *“Theoretical and observational constraints on the mass-radius relations of neutron stars”,
arXiv:1606.07804 (2016); K. Boshkayev, J. A. Rueda, M. Muccino.*

19) *“Main parameters of neutron stars from quasi-periodic oscillations in low mass X-ray
binaries”, arXiv:1604.02398 (2016); K. Boshkayev, J. A. Rueda, M. Muccino.*

20) *“On the rate and on the gravitational wave emission of short and long GRBs”,
arXiv:1602.03545 (2016); R. Ruffini, J. Rodriguez, M. Muccino, J. A. Rueda, Y. Aimuratov,
U. Barres de Almeida, L. Becerra, C. L. Bianco, C. Cherubini⁶, S. Filippi, D. Gizzi,
M. Kovacevic, R. Moradi, F. G. Oliveira, G. B. Pisani, Y. Wang.*

Curriculum vitae of Barbara Patricelli

PERSONAL DATA

Date and Place of birth

April 16, 1980, Ortona (CH), Italy

Citizenship

Italian

Address

Physics Department, University of Rome “La Sapienza”

Piazzale Aldo Moro 5

00185 Roma, Italy

Telephone

+39 06 4991 4299

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barbara.patricelli@icranet.org

EDUCATION

October 2006: Department of Physics and ICRA (International Center for Relativistic Astrophysics), University of Rome “La Sapienza”, Italy, admission to the International Relativistic Astrophysics Ph.D. Program (IRAP PHD) with a fellowship.

July 2006: University of L'Aquila, Italy, Specialistic Degree in Physics, grade 110/110 cum laude. Title of the Thesis: "The spectral energy distribution of stars in population synthesis techniques". Supervisors: Prof. Enzo Brocato, Dott.ssa Gabriella Raimondo.

April 2002: University of L'Aquila, Triennial Degree in Physics, grade 102/110. Title of the Thesis: "Earthquake forecast: present state and future perspective". Supervisors: Prof. Piero Monacelli, Dott.ssa Antonella Amoruso.

Luglio 1999: Technical-Commercial High School "L. Einaudi", Ortona (Ch), Italy, Technical High School Diploma, grade 100/100.

OBSERVATIONAL EXPERIENCES

2003: Observation of binary systems HD190042 e HD132844 with the Teramo-Normale-Telescope (TNT) in the Astronomical Observatory of Collurania-Teramo (Italy), within the program of photometric support to the search of extrasolar planets with SARG (Spettrografo Alta Risoluzione Galileo).

COMPUTERS

Operating systems: Windows, Linux

Programmimg languages: Fortran

Data reduction and analysis: Midas, Iraf, Romafot

Synthetic photometry packages: Synphot

Scientific: Mathematica

Plotting packages: Gnuplot, SuperMongo

Typography: Latex

LANGUAGES

Italian: Native language

English: Spoken (good); written (good); listening comprehension (good)

RELEVANT EXPERIENCES

2005-2006: Stage at the OACT about the transformation of stellar observable quantities from the theoretical plane to the observational one in the Optical and Near-Infrared.

MEETINGS AND SCHOOLS

- 1th Cesare Lattes Meeting on Gamma Ray Bursts, Black Holes and Supernovae, Mangaratiba (Brazil), February 25 - March 3, 2007
- 10th Italian-Korean Symposium on Relativistic Astrophysics, Pescara (Italy), June 25 - 30, 2007
- 4th Italian-Sino Workshop on Relativistic Astrophysics, Pescara (Italy), July 20 - 30, 2007
- National School of Astrophysics, 9th cycle, 2th course, Isola di San Servolo - Venezia (Italy), September 16 - 22, 2007

CONTRIBUTED TALKS

July 2007: “On the charge to mass ratio of neutron cores and heavy nuclei”, contributed talk presented at ”‘IV Italian-Sino Workshop”’, Pescara (Italy), July 20-30, 2007.

PUBLICATIONS

B. Patricelli, M. Rotondo, R. Ruffini, 2007: On the charge to mass ratio of neutron cores and heavy nuclei, Italian-Sino Workshop on Relativistic Astrophysics, Pescara (Italy), July 20 - 30, 2007. To be published in the American Institute of Physics-Conference Proceedings.

Rotondo Michael

Position: Post-doctoral researcher
Period covered: 2011-2012



I Scientific Work

Supercritical electric fields in nuclei and neutron stars
Electrodynamical properties of white dwarfs and neutron stars

II Conferences and educational activities

II a Conferences and Other External Scientific Work

- 1) Italian-Korean Symposium on Relativistic Astrophysics, 4-8 July 2011, Pescara (Italy): participant with the talk *The relativistic Feynman-Metropolis-Teller treatment for finite temperatures*.
- 2) IRAP Ph.D. and Erasmus Mundus Workshop: Recent news from MeV, GeV and TeV gamma rays domain: results and interpretations, 21-26 March 2011, Pescara (Italy): participant with the talk *From atoms to nuclear matter cores of stellar dimensions: a unified approach based on the relativistic Thomas-Fermi model*.

II B Other Teaching Duties

Teacher assistant of the course "Collasso gravitazionale, buchi neri, polarizzazione del vuoto e cosmologia" held by Prof. Remo Ruffini at Physics Department of the University "Sapienza", Rome, Italy, academic year 2010/2011.

Member of the examining committee chaired by Prof. Remo Ruffini at Physics Department of the University "Sapienza", Rome, Italy, academic year 2010/2011.

2011-2012 List of Publication

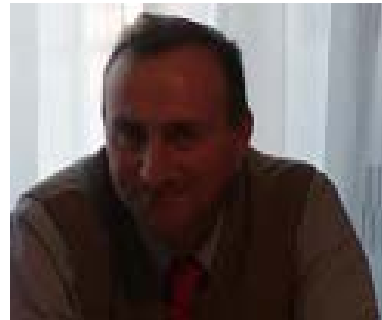
- 1) Rotondo M., Rueda J. A., Ruffini R. and S.-S. Xue, *The relativistic Thomas-Fermi treatment for compressed atoms at finite temperatures*, accepted for publication in *Il Nuovo Cimento C*, 2012.
- 2) Rotondo M., Rueda J. A., Ruffini R. and S.-S. Xue, *On degenerate compressed atoms and compressed nuclear matter cores of stellar dimensions*, in *Proceedings of the second Galileo-Xu Guangqi meeting, IJMPD*, Vol.12, 203-212, 2012.
- 3) Rotondo M., Rueda J. A., Ruffini R., Xue S.-S., *From compressed atoms to compressed massive nuclear density cores*, in the *Proceedings of the twelfth Marcel Grossmann meeting*, T. Damour, R. Janzen, R. Ruffini (eds.), World Scientific, p.1036, 2012.
- 4) Boskhaev K., Rotondo M. and Ruffini R., *On magnetic fields on rotating nuclear matter cores of stellar dimensions*, in *Proceedings of the Galileo-Xu Guangqi meeting, IJMPD*, Vol. 12, 58-67, 2012.
- 5) Boskhaev K., Rotondo M., Ruffini R., *On Nuclear Matter Cores and Their Applications*, in *Advances in Computational Astrophysics: Methods, Tools and Outcomes*, R. Capuzzo-Dolcetta, M. Limongi, A. Tornambè (eds.), Astronomical Society of Pacific, Vol. 453, p. 347, 2012.

- 6) Rueda J. A., Rotondo M., Ruffini R., Xue S.-S., *A new family of neutron star models: global neutrality versus local neutrality*, in the Proceedings of the twelfth Marcel Grossmann meeting, T. Damour, R. Janzen, R. Ruffini (eds.), World Scientific, p.1039, 2012
- 7) Rotondo M., Rueda J. A., Ruffini R., Xue S.-S., *Phys. Rev. D, Relativistic Feynman-Metropolis-Teller theory for white dwarfs in general relativity.*, Vol. 84, 084007, 2011
- 8) Rotondo M., Rueda J. A., Ruffini R., Xue S.-S., *Phys. Lett. B, The self-consistent general relativistic solution for a system of neutron, protons and electrons in beta equilibrium*, Vol. 701, 667, 2011.
- 9) Rotondo M., Rueda J. A., Ruffini R., Xue S.-S., *Phys. Rev. C, On the relativistic Thomas-Fermi treatment of compressed atoms and compressed nuclear matter cores of stellar dimensions*, Vol. 83, 045805, 2011.

Sigismondi Costantino

Position: Professor

Period covered: 1/11/2016-11/1/2018



I Scientific Work

Nova SCT 2017 and Nova SGR 2015 photometry with Schmidt-Cassegrain 8" telescope.

Completion of more than 2000 observation of variable stars for AAVSO database, of which 1000 in the last 2.5 years, mainly the Supergiant Betelgeuse and Antares and the Novae.

II Conferences and educational activities

II a Conferences and Other External Scientific Work UniCusano Workshop on Middle East Astronomy (26-27.X.2017) SIA Società Italiana di Archeoastronomia, National Congress Sapienza 6-8.IX.2017.

II b Work With Students History of Astronomy: coordinating studies on Angelo Secchi (1818-1878)

II c Diploma thesis supervision Tycho Brahe and the restoration of Astronomy (2017-2018)

II d Other Teaching Duties History of Astronomy chair (Pontifical University Regina Apostolorum, UPRA Rome)

II e. Work With Postdocs/

III. Service activities

III a. Within ICRANet Teacher in Scuola-Lavoro activities with Lyceum Galilei, Pescara

Notte dei Ricercatori Pescara 29.IX.2017

Organization and realization of Fermi and Astrophysics events at Fondazione Besso

Roma, 12.XII.2017, 8.I.2018 and 12.XII.2018 with 53 students of Rome Lyceum G. Ferraris

Preparation of Online Course on History of Astronomy and Astrophysics for Alternanza Scuola Lavoro Lyceums G. Ferraris, Roma G. Marconi, Civitavecchia and G. Galilei, Pescara. ([link](#)) (#)

Edition of Experimental Geometrical and Quantum Optics, in Gerbertus 10 (2017) for High Schools

Organization of Secchi and Astrophysics parallel session in Marcel Grossmann Meeting XV (Rome, July 2018)

III b. Outside ICRANet

UPRA course on History of Astronomy and direction of Master thesis

Lyceum Galileo Ferraris and ITIS, Rome courses on Physics and Laboratory.

Organization of the day in honor of Angelo Secchi bicentennial 27.2.2018 at UPRA

IV. Other

Participation to the Course on Modern Physics and to the Conferences Fisincittà

Rome 3 University November 2017- February 2018

and to the Course of Molecular Dynamics by Roberto Car (Fermi Chair 2017)

Sapienza University March-June 2017

2017 List of Publication

1. 2017arXiv170805065S Sigismondi, Costantino, Umbra in partial lunar eclipses at moonrise
2. 2017Gerb...10..119S Sigismondi, Costantino; Agolini, Giorgia, Il metodo di Aristarco à solo un modello?
3. 2017Gerb...10..107S Sigismondi, Costantino; Regoli, Irene , Allineamento della Basilica di san Pietro col Sole
4. 2017Gerb...10..123S Sigismondi, Costantino; Calore, Carlo ,Studi prospettici sulla fascia dell'eclittica dell'Atlante Farnese
5. 2017Gerb...10..105R Ruffini, Remo; Sigismondi, Costantino, Compressione gravitazionale in una dimensione
6. 2017Gerb...10...99S Sigismondi, Costantino, Misura di g con pendolo non in regime caotico
7. 2016Gerb...10...83S Sigismondi, Costantino, Effemeridi del transito meridiano 2017-2020 per la basilica di Santa Maria degli Angeli in Roma
8. 2016Gerb...10...75S Sigismondi, Costantino, Meaning and reception of the Gregorian Reformation of the Calendar
9. 2016Gerb...10...65S Sigismondi, Costantino; Petracca, Francesco Luigi, Energia di un sisma e oscillazioni di un pendolo

10. 2018arXiv/submit/2117830 Sigismondi, Costantino, Differential refraction, 2017 winter solstice timing and true ecliptic obliquity measured at the meridian line of Santa Maria degliAngeli in Rome
11. Ottica Sperimentale Quantistica e Geometrica, Sigismondi, C. e Daniele Impellizzeri Gerbertus 11 107-126 (2017) online

<http://www.icra.it/gerbertus/2017/ottica.pdf>

<https://docs.google.com/document/d/1BboioZGtkQFO-bEQoEbYoW8ygPvnFj7Kvug6I-Ejl4g/edit#>

Siutsou Ivan

Position: research fellow, ICRANet-Minsk, B.I. Stepanov Institute of Physics, NAS of Belarus

Period covered: May, September-October 2017



I Scientific Work

1. *Spotlight mechanism of GRB emission was analyzed and its efficiency was estimated (in preparation)*
2. *The accuracy of the numerical scheme for treatment of Boltzmann-Uehling-Uhlenbeck kinetic equation for two-particle interactions in electron-positron-photon plasma was estimated and compared to the known analytic results (with N.O. Prokopenya and G.V. Vereshchagin, submitted)*

II Conferences and educational activities

II a. *«Anisotropy of optical depth in relativistically moving media and its implications to GRB emission», 1st ICRANet-Minsk workshop on high energy astrophysics, Minsk, IP of NASB, April 26-28 2017*

II b. *Work with PhD student N.O. Prokopenya (scientific advisor — G.V. Vereshchagin)*

II c. *Diploma thesis supervision — no*

II d. *Other Teaching Duties — no*

II e. *Work With Postdocs — no*

III. Service activities *[activities carried out in collaboration with ICRANet (e.g. teaching activities, conferences etc...) and outside ICRANet (teaching activities in your university etc...)]*

III a. *Organization of the 1st ICRANet-Minsk workshop on high energy astrophysics, Minsk, IP of NASB, April 26-28 2017*

III b. *Organization of the VI Congress of physicists of Belarus, Minsk, IP of NASB, November 20-23 2017*

IV. Other

2017 List of Publication

1.N.O. Prokopenya, I.A. Siutson, G.V. Vereshchagin. Numerical scheme for treatment of Boltzmann-Uehling-Uhlenbeck kinetic equation for two-particle interactions in electron-positron-photon plasma // Journal of Computational Physics (submitted).

Visiting Scientists

Abishev Medeu



Position: head of al-Farabi Kazakh national university's

theoretical and nuclear physics department

Period covered: 7.07.2012-29.07.2012, 9.07.2015-9.08.2015

I Scientific Work

Research on GR and astrophysics

II Conferences and educational activities

II a Conferences and Other External Scientific Work

ICGAC-12 XIIth International Conference on Gravitation, Astrophysics and Cosmology Peoples' Friendship University of Russia (PFUR), Moscow, Russia, June 28-July 5, 2015

9th International Conference "Modern Achievements of Physics and Fundamental Physical Education", Faculty of Physics and Technology, Institute of Experimental and Theoretical Physics, The National Laboratory of Nanotechnology, Al Farabi Kazakh National University in Almaty, Kazakhstan, 12-14 October, 2016.

Workshop Phenomenology of Strong Gravity, Physics Department of Nazarbayev University, Astana, Kazakhstan, 14-16 September, 2016

II b Work With Student

Yerlan Aimuratov, Bakytzhan Zhamy, Manas Hasanov, Nurzat Kenzhebayev, Meruert Takibayeva

II c Diploma thesis supervision

Manas Hasanov, Nurzat Kenzhebayev, Amankhan Talkhat, Aygerim Abylayeva

II d Other Teaching Duties

Special courses for master students: GR mechanics, Mathematical methods of theoretical physics

II e. Work With Postdocs

Toktarbay Saken

III. Service activities

III a. Within ICRANet

III b. Outside ICRANet

Head of GRG laboratory in Institute of experimental and theoretical physics, Almaty

IV. Other

2016 List of Publication

Abishev, ME; Boshkayev, KA; Dzhunushaliev, VD; Ivashchuk, VD. Dilatonic dyon black hole solutions. CLASSICAL AND QUANTUM GRAVITY, 2015, Volume: 32, Issue: 16

Abishev, M; Aimuratov, Y; Aldabergenov, Y; Beissen, N; Bakytzhan, Takibayeva, M. Some astrophysical effects of nonlinear vacuum electrodynamics in the magnetosphere of a pulsar. ASTROPARTICLE PHYSICS, Volume: 73, Pages: 8-13

M. Abishev, K. Boshkayev, H. Quevedo, S. Toktarbay. A perfect-fluid spacetime for a slightly deformed mass. Proceedings of XIIth International Conference on Gravitation, Astrophysics, and Cosmology pp.246-247. 2016.

M. Abishev, K. Boshkayev, H. Quevedo, S. Toktarbay. Accretion disks around a mass with quadrupole. Proceedings of XIIth International Conference on Gravitation, Astrophysics, and Cosmology. P.185-186. 2016.

Bobomurat Ahmedov

Position: Full Professor in Astrophysics and Theoretical Physics
Head, Stellar Astrophysics Department
Ulugh Beg Astronomical Institute
Uzbekistan Academy of Sciences
Astronomicheskaya 33, Tashkent 100052
UZBEKISTAN



I Scientific Work

My main duty is to carry out the theoretical research in the field of electrodynamics of continuous media in general relativity and relativistic astrophysics and observational research on GPS and VLF data analysis for ionospheric disturbances caused by various atmospheric, terrestrial and extraterrestrial phenomena. At present I am holding a position of Projects Leader and Head of Stellar Astrophysics Department in the Ulugh Beg Astronomical Institute in Tashkent, position Principal Scientific Researcher (part time) at the Institute of Nuclear Physics and position of Full Professor (part time) at the Uzbekistan National University in Tashkent. I was co-organizer of Int. Symposium on Experimental Gravitation held in Samarkand, Uzbekistan, 1999. I am delivering lectures to graduate students at the Samarkand State University during the years 1993 - 2001 and at the National University of Uzbekistan, Tashkent from year 2001. I am coordinator of AS-ICTP Network (NT-01) on Theoretical Astrophysics, Gravitation and Cosmology between India, Thailand and Uzbekistan (ITUN, NET-76). I am a member of Scientific Councils at the Ulugh Beg Astronomical Institute and at the Institute of Nuclear Physics, Tashkent. I was Vice-Chairman of Scientific Council D.067.02.13 awarding PhD/DrSc degrees in Astrophysics and Radioastronomy & Theoretical Physics at the National University of Uzbekistan (January 2009 to 2013). Now I am a member of the Expert Group of the Supreme Attestation Committee under Cabinet of Ministers of the Republic of Uzbekistan (starting January 2014).

My research is mainly devoted to the general-relativistic electrodynamics of continuous media and its application for theoretical explanation and analysis of EM (electromagnetic) and astrophysical processes in the external gravitational fields, Particles and Fields in the vicinity of Black Holes. Experimental tests of general relativity, general relativistic EM effects and fields for pulsars and magnetized rotating and oscillating neutron stars are also in my scientific interests. In addition I do a research on VLF (very low frequency) EM wave propagation in Earth ionosphere and study of the ionospheric disturbances in D and F layers of the ionosphere caused by various atmospheric, terrestrial and extraterrestrial phenomena.

II Conferences and educational activities

II a. Conferences and Other External Scientific Works

SEMINARS, SUMMER SCHOOLS AND CONFERENCES attended in year 2017

International Conference on Applied and Fundamental Problems of Physics, Tashkent, 13-14 June, 2017

II b. Work With PhD Students

- **Farruh Atamurotov**, PhD student, Optical and Energetic processes in vicinity of relativistic compact objects (**Ph.D. degree is expected in 2018**)
- **Sanjar Shaymatov**, PhD student, General relativistic astrophysical processes in the vicinity of compact gravitational objects in the presence of an electromagnetic field, (**Ph.D. degree is expected in 2018**)
- **Abdullo Hakimov**, PhD student, Relativistic Astrophysical Processes in Axial Symmetric Alternative Gravitational Models, (**Ph.D. degree is expected in 2018**)
- **Ozodbek Rahimov**, PhD student, Particle Motion and Electromagnetic Fields around Axial Symmetric Gravitating Objects, (**Ph.D. degree is expected in 2020**)
- Husan Eshkuvatov, PhD student (enrolled at present)
- Javlon Rayimbaev, PhD student (enrolled at present)
- Pulat Tajimuratov, PhD student (enrolled at present)
- Baktiyor Narzilloev, graduate student (enrolled at present, M.Sc. degree is expected in June 2018)

II c. Diploma thesis supervision

II d. Other Teaching Duties

Fall term 2017: Course in Methods of Mathematical Physics, (80 lecture hours) for the 3rd year undergraduate students (Bachelor Course), Chair of Theoretical Physics, Faculty of Physics, National University of Uzbekistan, Tashkent, Uzbekistan.

Fall term 2017: Course in Relativistic Astrophysics and Cosmology (50 lecture hours) for the 2nd year graduate students (Master Course), Chair of Theoretical Physics, Faculty of Physics, National University of Uzbekistan, Tashkent, Uzbekistan.

Fall term 2017: Course in Nuclear Astrophysics (50 lecture hours) for the 2nd year graduate students (Master Course), Chair of Nuclear Physics, Faculty of Physics, National University of Uzbekistan, Tashkent, Uzbekistan.

II e. Work With Postdocs

Partial work with Dr. **Ahmadjon Abdujabbarov**, PhD, starting 2009 on project “General Relativistic Astrophysical Processes in Vicinity of Axial Symmetric Compact Objects in Presence of Magnetic Field”

III Service activities

Within ICRANet

Outside ICRANet

Details of projects leaded in year 2017

Leader of 4 Years Research Project "*Astrophysical Processes in Stationary and Dynamic Relativistic Gravitation Objects*" from the Uzbekistan Academy of Sciences, **Grant VA-FA-F-2-008-A**, Tashkent, Uzbekistan (**1 January 2017 - 31 December 2020**).

Member of Expert Group on Physics and Mathematics of the Supreme Attestation Committee under the Cabinet of Ministers of the Republic of Uzbekistan (starting **January 2014 up to now**).

IV Other

“Science Leader” Web of Science award – 2017, selection by the Clarivate Analytics Web of Science as the highly cited author at the second position in the country (Uzbekistan) with 77 papers published in the refereed journals during the last 10 years.

Coordinator, The AS-ICTP India-Kazakhstan-Thailand-Uzbekistan Network (IKTUN, NT-01) on Theoretical Astrophysics, Gravitation and Cosmology.

Member of the International Advisory Committee of joint meeting of ICGAC XIII (International Conference on Gravitation, Astrophysics, and Cosmology) and IK15 (Italian-Korean Symposium on Relativistic Astrophysics), July 3-7, **2017**.

Member of the International Advisory Committee of the V-th International Conference on on Cosmology, Relativistic and Nuclear Astrophysics (ICCRNA 2017), Almaty, October 31-November 4, **2017**.

2017 List of Publications

1. Bobir Toshmatov, Cosimo Bambi, **Bobomurat Ahmedov**, Ahmadjon Abdujabbarov and Zdenek Stuchlik, Energy conditions of non-singular spacetimes in conformal gravity, **European Physical Journal C**, 2017, Vol. 77, id. 542, 10pp.

2. B. Toshmatov, Z. Stuchlik, **B. Ahmedov**, Generic rotating regular black holes in general relativity coupled to nonlinear electrodynamics, **Phys. Rev. D**, 2017, V. 95, 084037, 16pp.
3. Bobir Toshmatov, Cosimo Bambi, **Bobomurat Ahmedov**, Zdenek Stuchlik, Jan Schee, Scalar perturbations of non-singular non-rotating black holes in conformal gravity, **Phys. Rev. D**, 2017, V.96, id. 064028, 10pp.
4. Ahmadjon Abdujabbarov, **Bobomurat Ahmedov**, Farruh Atamurotov, Naresh Dadhich, Optical Properties of Braneworld Black Hole: Gravitational Lensing and Retrolensing, **Phys. Rev. D**, 2017, V.96, id.084017, 11pp.
5. B. Turimov, **B. Ahmedov** and A. Hakimov, The stationary electromagnetic fields of a slowly rotating relativistic magnetized star in the braneworld, **Phys. Rev. D**, 2017, V.96, id.104001, 14pp.
6. A. Abdujabbarov, B. Toshmatov, Z. Stuchlik, **B. Ahmedov**, Shadow of the rotating black hole with quintessential energy in the presence of the plasma // **International Journal of Modern Physics D**, 2017, v. 26, 1750051, 15pp.
7. A. Abdujabbarov, B. Toshmatov, J. Schee, Z. Stuchlik, **B. Ahmedov**, Gravitational Lensing by Regular Black Holes Surrounded by Plasma//**International Journal of Modern Physics D**, 2017, v. 26, No. 5, 1741011, 18pp.
8. B. Toshmatov, Z. Stuchlik, **B. Ahmedov**, Rotating black hole solutions with quintessential energy, **Eur. Phys. J. Plus**, 2017, v. 132, id. 98, 21 pp.
9. B. Toshmatov, Z. Stuchlik, **B. Ahmedov**, Comments on paper "Casimir Effect in the Kerr spacetime with Quintessence", **Modern Physics Letters A**, 2017, Vol. 32, 1775001, 6pp.
10. V.S. Morozova, **B. Ahmedov**, O. Zanotti, Explaining Radio Emission of Magnetars Via Rotating And Oscillating Magnetospheres Of Neutron Stars, Proc. MG14 Mtg on Gen. Rel., Bianchi M., Ruffini R., Jantzen R. eds., 2017, World Scientific, pp.4087-4094.
11. V.S. Morozova, **B. Ahmedov**, O. Zanotti, General Relativistic Plasma Magnetospheres Of Slowly Rotating And Oscillating Magnetized Neutron Stars, Proc. MG14 Mtg on Gen. Rel., Bianchi M., Ruffini R., Jantzen R. eds., 2017, World Scientific, pp.4305-4312.
12. B. Toshmatov, Z. Stuchlik, **B. Ahmedov**, Note on the character of the generic rotating charged regular black holes in general relativity coupled to nonlinear electrodynamics, Proceedings of RAGtime 17-19, **Opava**, Czech Republic, Z. Stuchlik, G. Torok and V. Karas, editors, Silesian University in Opava, 2017, pp. 195–199.

Wilmer Alfonso | Curriculum Vitæ

✉ wilmer.alfonso@udea.edu.co

PERSONAL INFORMATION

Full Name: Wilmer Daniel Alfonso Pardo

Nationality: Colombian

Institute: Institute of Physics, University of Antioquia (UdeA), Calle 67 No. 53-108, office 6-105, Medellín, Colombia. Phone number +57 4 219 5630

homepage: <http://www.udea.edu.co>

CV Online: CvLAC -Plataforma SCienTI - Colombia

EDUCATION

University of Antioquia <i>Physics PhD Student</i>	Medellín 2014–present
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National University of Colombia <i>Master of Science in Physics</i>	Medellín 2010–2012
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National University of Colombia <i>Physics Engineer</i>	Medellín 2009
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Doctoral Research Topic.....

Thesis: *On the role of coherence in generation and propagation of gravitational waves emitted by N-Body systems.*

Supervisor: Professor Leonardo A. Pachón (leonardo.pachon@udea.edu.co). Atomic and Molecular Physics Group, University of Antioquia, Medellín, Colombia ([homepage](#)).

Master's Thesis.....

Title: *Gravitational radiation emitted by accretion disks dynamically driven by the Bardeen-Petterson effect.*

Supervisors: Professor Luis A. Sánchez Duque. National University of Colombia, Medellín. Professor Herman J. Mosquera Cuesta. Instituto de Cosmología, Relatividade e Astrofísica (ICRA-BR), International Center for Relativistic Astrophysics Network (ICRANet).

CURRENT RESEARCH

GWs from N-body systems: We are studying the wavelike properties of the gravitational radiation emitted by astrophysical N-Body systems. The case of $N = 2$, i.e., binary systems, have been studied to a wide extent in the point particle approximation and considering them as isolated systems. The aim of our work is to analyze the spectrum of the gravitational waves emitted by these systems when there are more than one radiation channel in operation.

RESEARCH EXPERIENCE

Undergraduate: I started my research experience in 2007 when I joined the Theoretical Physics Group at the National University of Colombia. The interests of the group cover a wide range of topics associated with particle physics, standard model, quantum field theory, groups theory and general relativity. There, I carried out my first research project on "Gravitational Waves: Theory and Detection Methods" as a partial requirement for my bachelor's degree, under the direction of Professor Luis Sánchez.

MSc in Physics: In this work we characterized the gravitational radiation emitted by models of GRBs- engines, particularly from the dynamics of accretion disks. Part of the results obtained were published in "The Open Astronomy Journal", and in the proceedings of the VIII Friedmann Seminar, held in Rio de Janeiro, Brazil (May 30-June 03/2011).

SCIENTIFIC ACTIVITIES

Main Research Interests: *General Relativity, Astrophysics, Black Holes, GRBs, Gravitational Waves*

Participation in research groups.....

ICRANet - International Center for Relativistic Astrophysics Network **Pescara, Italy**
Visiting student at ICRANet, web site Nov. 2, 2016 – Apr. 30, 2017

Atomic and Molecular Physics Group, University of Antioquia **Medellín**
Research Assistant, GrupLAC 2014–present

Theoretical Physics Group, National University of Colombia **Medellín**
Research Assistant, GrupLAC 2007–2013

Conferences and Seminars attended.....

ICTP-SAIFR, Brazil **São Paulo**
Workshop on Astrophysics and Relativity: Astro-GR 2015 Aug. 11–15, 2015

ICTP-SAIFR, Brazil **São Paulo**
School on Gravitational Waves: from data to theory and back Aug. 3–11, 2015

SMFNS 2015, Cuba **Varadero**
4th International Symposium on Strong Electromagnetic Fields and Neutron Stars May 13–16, 2015

STARS 2015, Cuba **Havana**
3rd Caribbean Symposium on Cosmology, Gravitation, Nuclear and Astroparticle Physics May 10–13, 2015

Ruta n, Colombia **Medellín**
X Latin American Symposium on High Energy Physics (SILAFAE) Nov. 24–28, 2014

Victoria University, Australia & Universidad de la Sabana, Colombia **Bogotá**
Student Workshop: Demystifying Doctoral Research Oct. 30–Nov. 1, 2014

GFAM - Universidad de Antioquia, Colombia **Medellín**
International Workshop on Quantum Coherence and Decoherence II Aug. 25–29, 2014

ICTP-SAIFR, Brazil **São Paulo**
Advanced School in General Relativity: Relativistic Astrophysics and Cosmology July 16–27, 2012

Universidad Nacional de la Plata, Argentina **La Plata**
International School in Quantum Gravity July 19–27, 2010

Biblioteca Nacional, Argentina **Buenos Aires**
Quantum Gravity in the Southern cone V July 28–31, 2010

PUBLICATIONS

Alfonso, W. D., Sánchez, L. A. and Mosquera, H. J. *Emission of gravitational waves by precession of slim accretion disks dynamically driven by the Bardeen-Petterson effect.* *Astron. Nachr.*, **336**: 815–819 (2015).
doi: 10.1002/asna.201512222. Web site: [Abstract](#)

H. J. Mosquera Cuesta, L. A. Sanchez, **Daniel Alfonso Pardo**, A. Caproni and Z. Abraham. *Gravitational Waves Produced by Ejection of Jet Superluminal Components, Precession and Gravito-Magnetic Distortion of Accretion Disks in Active Galactic Nuclei, Micro-Quasars, and T-Tauri Stars Dynamically Driven by Bardeen-Petterson Effect.* *The Open Astronomy Journal* **4** (Suppl 1-M6), Pp 98-107 (2011). Web site: [Abstract](#)

H. J. Mosquera Cuesta, L. A. Sanchez, **Daniel Alfonso Pardo**, A. Caproni and Z. Abraham, Luis H. Quiroga Nuñez. *Gravitational Waves from Ejection of Jet Superluminal Components and Precession of Accretion Disks*

SCHOLARSHIPS, HONORS AND AWARDS

Fellow of the PhD Scholarship

Colombian Institute for the Science and Technology Development (COLCIENCIAS)

March 2014

Meritorious Master's Thesis

National University of Colombia

May 2013

Fellow of the Scholarship for Outstanding Graduate Students

National University of Colombia

May 2010

COMPUTER SKILLS

Operating Systems: Microsoft, Gnu/Linux, Mac OS **Office:** Office, OpenOffice, LibreOffice.

Scientific Programming: Matlab, Mathematica, C, Python **Edition:** L^AT_EX.

LANGUAGES

Spanish: Mother tongue

English: Proficient

Writing (Good), Reading (Good), Speaking (Good)

Portuguese: Proficient

Writing (Good), Reading (Good), Speaking (Good)



Last updated, Nov. 2016.

Ansoldi Stefano

Position: Researcher, University of Udine
Period covered: permanent position



I Scientific Work

- Quantum cosmology.
 - Tunneling with wormhole creation, and upward tunneling in early universe cosmology.
- Modified gravity
 - Bounded curvature models in $f(R)$ cosmology.
- Relativistic and High Energy Astrophysics:
 - Development of a framework (TATA) for automated VOEvent selection, and reaction, to gravitational wave alerts.
 - Maintenance of a framework (MA4U) for automated analysis of Fermi data, and subsequent alerting of potential targets.

II Conferences and educational activities

II a Conferences and Other External Scientific Work

II b Work With Students

1. Udine school of excellence, end of year dissertations:
 - a. Marco Gambone (2017), *Relativistic generalizations of Schrödinger equation* [in Italian];
 - b. Paolo Arnaudo (2017), *Lie groups and applications to physics* [in Italian];
 - c. Claudio Verardo (2017), *Introduction to quantum mechanics (non-relativistic theory)* [in Italian];

II c Master thesis supervision

1. Francesco Maria Fabbri (2017), Master in physics, in collaboration with Bruno Giacomazzo (Trento university, Italy): *General Relativistic simulation of binary neutron stars merger: an engine for Short Gamma Ray Burst*;
2. Fabio Decolle] (2017) master in physics: *Recent developments in gauge approaches to conformal gravity*;

II d Other Teaching Duties

II e. Work With Postdocs

1. Yuki Sakakihara (Osaka city university, JAPAN), topic: *Bounded curvature models in $f(R)$ cosmology*.

III. Service activities [*activities carried out in collaboration with ICRANet (e.g. teaching activities, conferences etc...) and outside ICRANet (teaching activities in your university etc...)*]

III a. Within ICRANet

III b. Outside ICRANet

1. General Relativity, Master in Physics, University of Trieste;
2. Advanced General relativity, Master in Physics, University of Trieste
3. Theoretical Physics, School of Excellence, University of Udine

IV. Other

1. Member of the advisory panel of *Classical and Quantum Gravity*
2. Referee for some international, peer-reviewed journals
3. Member of MAGIC time allocation committee (TAC)

2017 List of Publication

1. *Constraining $f(R)$ Gravity with Planck Sunyaev-Zel'dovich Clusters*, S. Peirone, M. Raveri, M. Viel, S. Borgani, S. Ansoldi, **Phys. Rev. D** **95** (2017) 023521
2. *Indirect dark matter searches in the dwarf satellite galaxy Ursa Major II with the MAGIC Telescopes*, MAGIC Collaboration (M.L. Ahnen, S. Ansoldi, *et al.*), **arXiv:1712.03095 [astro-ph.HE]**
3. *Constraining Lorentz invariance violation using the Crab Pulsar emission observed up to TeV energies by MAGIC*, MAGIC Collaboration (M.L. Ahnen, S. Ansoldi, *et al.*) **Astrophys. J. Suppl.** **232** (2017) 9
4. *MAGIC Contributions to the 35th International Cosmic Ray Conference (ICRC2017)*, MAGIC Collaboration (M.L. Ahnen, S. Ansoldi, *et al.*) **arXiv:1708.05153 [astro-ph.HE]**
5. *Search for very high-energy gamma-ray emission from the microquasar Cygnus X-1 with the MAGIC telescopes*, MAGIC Collaboration (M. L. Ahnen, S. Ansoldi, *et al.*) **Mon.Not.Roy.Astron.Soc.** **472** (2017) 3474
6. *Constraints on particle acceleration in SS433/W50 from MAGIC and H.E.S.S. observations*, MAGIC and H.E.S.S. Collaborations (M.L. Ahnen, S. Ansoldi, *et al.*), **DOI: 10.1051/0004-6361/201731169**

7. *A cut-off in the TeV gamma-ray spectrum of the SNR Cassiopeia A*, MAGIC Collaboration (M.L. Ahnen, S. Ansoldi, *et al.*) **Mon. Not. Roy. Astron. Soc.** **472** (2017) 2956
8. *MAGIC observations of the microquasar V404 Cygni during the 2015 outburst*, MAGIC Collaboration (M.L. Ahnen, S. Ansoldi, *et al.*) **Mon. Not. Roy. Astron. Soc.** **471** (2017) 1688
9. *Observation of the Black Widow B1957+20 millisecond pulsar binary system with the MAGIC telescopes*, MAGIC Collaboration (M.L. Ahnen, S. Ansoldi, *et al.*), **Mon. Not. Roy. Astron. Soc.** **470** (2017) 4608
10. *Performance of the MAGIC telescopes under moonlight*, MAGIC Collaboration (M.L. Ahnen, S. Ansoldi, *et al.*), **Astropart. Phys.** **94** (2017) 29
11. *First Multi-wavelength Campaign on the Gamma-ray-loud Active Galaxy IC 310*, MAGIC Collaboration (M. L. Ahnen, S. Ansoldi, *et al.*), **Astron. Astrophys.** **603** (2017) A25
12. *Very-high-energy gamma-ray observations of the Type Ia Supernova SN 2014J with the MAGIC telescopes*, MAGIC Collaboration (M.L. Ahnen, S. Ansoldi, *et al.*), **Astron. Astrophys.** **602** (2017) A98
13. *MAGIC detection of very high energy γ -ray emission from the low-luminosity blazar 1ES 1741+196*, MAGIC and Fermi-LAT Collaborations (M.L. Ahnen, S. Ansoldi, *et al.*), **Mon. Not. Roy. Astron. Soc.** **468** (2017) 1534
14. *Multiband variability studies and novel broadband SED modeling of Mrk 501 in 2009*, MAGIC and VERITAS Collaborations (M.L. Ahnen, S. Ansoldi, *et al.*), **Astron. Astrophys.** **603** (2017) A31
15. *Observations of Sagittarius A* during the pericenter passage of the G2 object with MAGIC*, MAGIC Collaboration (M. L. Ahnen, S. Ansoldi, *et al.*), **Astron. Astrophys.** **601** (2017) A33
16. *A search for spectral hysteresis and energy-dependent time lags from X-ray and TeV gamma-ray observations of Mrk 421*, VERITAS and MAGIC Collaborations (A.U. Abeysekara, ..., S. Ansoldi, *et al.*), **Astrophys. J.** **834** (2017) 2
17. *Multiwavelength observations of a VHE gamma-ray flare from PKS 1510-089 in 2015*, MAGIC Collaboration (M.L. Ahnen, S. Ansoldi, *et al.*), **Astron. Astrophys.** **603** (2017) A29
18. *Very high energy follow-up programs of gravitational wave and transient alerts with the MAGIC telescopes*, A. Carosi, S. Ansoldi, L. A. Antonelli, A. Berti, B. De Lotto, F. Longo, A. Stamerra, and the MAGIC Collaboration, **AIP Conf. Proc.** **1792** (2017) 060014
19. *MAGIC electromagnetic follow-up of gravitational wave alerts*, B. De Lotto, S. Ansoldi, A. Antonelli, A. Berti, A. Carosi, F. Longo, A. Stamerra, **IAU Symp.** **324** (2016) 287

Arkhangelskaja Irene

Position: senior lecturer, Department of Experimental Nuclear Physics and Cosmophysics,
National Research Nuclear University "MEPhI", Moscow, Russia

Period covered: 2017



I Scientific Work

Gamma-Ray Bursts investigation (spectra, temporal profiles, models) on data of detectors onboard near-Earth satellites,

Background condition at near-earth orbits in energy range 5 keV-100 MeV and appearance of magnetosphere phenomena on such orbits in this energy range,

Gamma-emission processes in astrophysics sources,

Dark matter and dark energy presence observation possibilities in satellite experiments

Methods of gamma-quanta and charged particles identification due detectors based on schintillators

Fractal analysis application to data of gamma-detectors onboard satellites both at near-Earth and high apogee orbits.

II Conferences and educational activities

II a Conferences and Other External Scientific Work

I took part in International Symposium on Cosmic Rays and Astrophysics held in NRNU MEPhI (Moscow) 20 –22 June 2017 with 2 talks as presented author and was co-author in other 3 talks.

II b Work With Students

I'm scientific advisor of Mikhailova A.V. student's research work "Background conditions of gamma-detectors onboard near-Earth satellites" (NRNU MEPhI)

II c Diploma thesis supervision

I was scientific advisor of two bachelor's diploma:

1. Lyapin A. R. "Pulsars registration methods comparison in experiments Fermi\LAT and GAMMA-400" (NRNU MEPhI)
2. Khyzhniak E. V. "Characteristics of GRBs with high redshift on data of satellites experiments at near-Earth orbits" (NRNU MEPhI)

III. Service activities [*activities carried out in collaboration with ICRANet (e.g. teaching activities, conferences etc...) and outside ICRANet (teaching activities in your university etc...)*]

III a. Within ICRANet

I'm member of Marcel Grossmann Meeting International Coordinating Committee since 2009

III b. Outside ICRANet

As senior lecturer in National Research Nuclear University “MEPhI” I read 3 courses of lectures for the students at Master's degrees:

- 1) Actual problems of micro- and cosmophysics (in Russian)
- 2) Nuclear physics (in Russian and in English)
- 3) Electroweak interaction (in Russian)

and course Introduction to Nuclear physics for bachelors/

IV. Other

I was Scientific Secretary of Program Committee of the International Symposium on Cosmic Rays and Astrophysics held in NRNU MEPhI (Moscow) 20 –22 June 2017 and now I provide proceeding editing process

I was head of section Astrophysical sources of gamma-rays at Second International conference on particle physics and astrophysics held in NRNU MEPhI (Moscow) 10 –14 October 2016, provides proceeding editing process in Journal of Physics: Conference Series in 2017

2017 List of Publication

- Arkhangelskaja, I. V. Properties of intermediate GRBs subset, according to the GBM, BAT, and BATSE data, Bulletin of the Russian Academy of Sciences: Physics, vol. 81, issue 4, pp. 419-423
- Arkhangelskaja, I. V. Intermediate GRBs observed by various satellite experiments, Journal of Physics: Conference Series, Volume 798, Issue 1, article id. 012007 (2017)
- Troitskaya, E. V.; Arkhangelskaja, I. V.; Arkhangelskiy, A. I. The results of January 20, 2005 solar flare study by narrow gamma lines, Journal of Physics: Conference Series, Volume 798, Issue 1, article id. 012043 (2017)
- Topchiev, N. P.; Galper, A. M.; Bonvicini, V.; Adriani, O.; Arkhangelskaja, I. V. et al, New stage in high-energy gamma-ray studies with GAMMA-400 after Fermi-LAT, EPJ Web of Conferences, Volume 145, id.06001 (2017)

- Arkhangelskaja, I. V.; Arkhangelskiy, A. I.; Chasovikov, E. N.; Kheymits, M. D. et al, Gamma-quanta and charged particles recognition by the counting and triggers signals formation system of GAMMA-400 space gamma-telescope, *Journal of Physics: Conference Series*, Volume 798, Issue 1, article id. 012016 (2017)
- Topchiev, N. P.; Galper, A. M.; Arkhangelskiy, A. I.; Arkhangelskaja, I. V. et al, The structure, logic of operation and distinctive features of the system of triggers and counting signals formation for gamma-telescope GAMMA-400, *Journal of Physics: Conference Series*, Volume 798, Issue 1, article id. 012015 (2017)
- Leonov, A. A.; Galper, A. M.; Topchiev, N. P.; Bonvicini, V.; Adriani, O.; Arkhangelskaja, I. V. et al, Modifications of a method for low energy gamma-ray incident angle reconstruction in the GAMMA-400 gamma-ray telescope, *Journal of Physics: Conference Series*, Volume 798, Issue 1, article id. 012012 (2017)
- Topchiev, N. P.; Galper, A. M.; Bonvicini, V.; Adriani, O.; Arkhangelskaja, I. V. et al, *Journal of Physics: Conference Series*, Volume 798, Issue 1, article id. 012011 (2017)
- Lyapin, A. R.; Arkhangelskaja, I. V.; Larin, D. S., Unidentified EGRET sources and their possible Fermi counterparts, *Journal of Physics: Conference Series*, Volume 798, Issue 1, article id. 012005 (2017)
- Khyzhniak, E. V.; Arkhangelskaja, I. V.; Lyapin, A. R., Open Supernova Catalog objects subsample characteristics, *Journal of Physics: Conference Series*, Volume 798, Issue 1, article id. 012004 (2017)
- Topchiev, N. P.; Galper, A. M.; Bonvicini, V.; Arkhangelskaja, I. V. et al, High-energy gamma-ray studying with GAMMA-400, eprint arXiv:1707.04882 (2017)

Zhami Bakytzhan

Position: PhD student,
Al-Farabi Kazakh National University

Period covered: 07/07/2017-20/08/2017



I Scientific Work

General Relativity, Physics of White Dwarfs.

II Conferences and educational activities

II a Conferences and Other External Scientific Work

1. Supernovae, Hypernovae and Binary Driven Hypernovae, An Adriatic Workshop, June 20-30, 2016, Pescara, Italy
2. Phenomenology of Strong Gravity, Workshop, September 14-16, 2016, Astana, Kazakhstan.
3. The 9-th International Scientific Conference “Modern Achievements of Physics and Fundamental Physical Education”, October 12-14, 2016, Almaty, Kazakhstan.
4. International Scientific Conference of Students and Young Scientists, April 10-13, 2017, Almaty, Kazakhstan.
5. 5-th International Conference on Cosmology, Relativistic and Nuclear Astrophysics, October 31-November 4, 2017, Almaty, Kazakhstan.

2017 List of Publication

1. K. Boshkayev, B. Zhami, Z. Kalymova, Z. Brisheva, News of the NAS RK, Vol. 6, Num. 316, 27-38, 2017.
2. K. Boshkayev, J.A. Rueda, R. Ruffini, B. Zhami, Z. Kalymova, G. Balgimbekov, Mass-radius relations of white dwarfs at finite temperatures, Proceedings of the 14th Marcel Grossmann Meeting, p. 4287-4290, 2017.
3. K. Boshkayev, J.A. Rueda, R. Ruffini, B. Zhami, Induced compression of white dwarfs by angular momentum loss, Proceedings of the 14th Marcel Grossmann Meeting, p. 4379-4384, 2017.
4. K. Boshkayev, H. Quevedo, B. Zhami, Monthly Notices of the Royal Astronomical Society, Vol. 464, Issue 4, p.4349-4359, 2017.

Batebi Saghar

University: Isfahan University of Technology, Iran.

Position: Visiting researcher

Period covered: 12/2014-5/2015



I Scientific Work:

The investigation of Higgs boson production and decay channel in NonCommutative space-time.

Study of CMB polarization in NonCommutative space-time.

Study of the GRB circular polarization.

Interaction of high energy photons with the background radiation in the universe.

III. Service activities

Islamic Azad University, teaching Fundamantal Physics, Electricity and magnetic physics and related Labs.

2015 List of Posters

S. Batebi; S. Tizchang; R.Mohammadi; R. Ruffini; S. S. xue 'The generation of circular polarization of GRB, MG14.

S.Tizchang, S.Batebi, R. Mohammadi, R. Ruffini , G. Vereshchagin, S.-S. Xue, Interaction of high energy photons with the background radiation in the universe, MG14.

2015 List of Publication

S. Batebi, M. Haghighat, S. Tizchang, H. Akafzadeh, Higgs Couplings in NonCommutative Standard Model, International journal of modern physics A, vol 3, number 20 (2015).

Čadež Andrej

Position: retired prof. emeritus

Period covered: 2013/14



I Scientific Work

Pulsar timing, braking study, pulsar-nebula interaction

II Conferences and educational activities

II a Conferences and Other External Scientific Work:

VERY HIGH TIME AND SPACE RESOLUTION ASTROPHYSICS, Asiago winter school 2013

Prague Sinergy 2013, 2014

2014 List of Publication:

Zampieri, Čadež, , Barbieri et al, [2014MNRAS.439.2813Z](#)

Stanley P. Davis

Research Areas:

- Laboratory Astrophysics: High Energy Astrophysics / Density Physics
- Laser-Driven Inertial Fusion Energy
- Multi-wavelength Astrophysics: High Energy Astrophysical Transients, e.g., gamma-ray bursts (GRBs)
- Plasma Physics; Relativistic Beaming, Plasma Instabilities
- Laser Physics / Optics
- Nano-physics
- Medical Applications of Laser Plasma Interactions

Refereed Publications:

1. "Ion Beam Weibel Instability Simulations of Energy Transfer in Gamma-ray Bursts via Laser Irradiation on Foil", Davis, S P., Tikhonchuk V., d'Humières, E., Bochkarev, S
2. "Weibel Instability Simulations for Gamma-ray Bursts as an Application of Laboratory Astrophysics" Davis, S P., Tikhonchuk V., d'Humières, E., Weber S, Inertial Fusion Sciences with Applications 2009 (IFSA 2009), San Francisco, USA, 2009
3. "Gamma-ray Burst Simulations via Collisionless-Shock Driven Proton Weibel Instability", Davis S P, Tikhonchuk V, d'Humières E, Weber S, in preparation
4. "Extracted Dispersion from Spectrally Dispersed Young's Double Slit for the National Ignition Facility Coherent Addition of Pulses for Energy", Stanley Davis, Michael Rushford, Antonio Lucianetti, Igor Jovanovic, Lawrence Livermore National Laboratory / National Ignition Facility, written, to be published
5. "Coherent Addition of Pulse for Energy (CAPE) Instrument and Data Fitting Model Study", UCRL-ABS-225307, Michael C. Rushford, Stanley Davis, Antonio Lucianetti, et. al., Lawrence Livermore National Laboratory
6. "Model for the Redshift and Luminosity Distributions of Gamma-Ray Blazars", C. Dermer and S. P. Davis, 5th Compton Symposium Proceedings, 1999, AIP
7. "Pulse-Width, Pulse-Interval Distributions and Total Counts as Indicators of Time Dilation in Gamma-Ray Bursts", Davis, S. P. RIKEN Review, 1997
8. "Measurements of Time Dilation in Gamma-Ray Bursts by Analysis of Temporal Structure", Davis, S. P., 1995
9. "Measurement of Time Dilation in Pulse Widths and Intervals Between Pulses", Davis, S. P. 1994, BAAS, 26,
9. "Consistency of Time Dilation in Temporal Profiles and Spectra of Gamma-ray Bursts", Norris, J.P., Nemiroff, R.J., Bonnell, J.T., Scargle, J.D., Davis, S.P., et al. 1995, Adv. Space Res., Vol 15, No. 5, pp. (5)135-(5)138, COSPAR
10. "Exploration of Bi-Modality in Gamma-Ray Burst Duration and Hardness Distributions", Norris, J.P., Nemiroff, R.J., Davis, S.P., et al.: AIP Conference Proceedings 307, Huntsville Gamma-Ray Burst Workshop, 1994
11. "Pulse Width Distributions and Total Counts as Indicators of Cosmological Time Dilation in Gamma-Ray Bursts", Davis, S.P., et al.: AIP Conference Proceedings 307, Huntsville Gamma-Ray Burst Workshop, 1994
12. "Measurement of Signature Consistent with Cosmological Time Dilation in Gamma-Ray Bursts", Norris, J.P., Davis, S.P., et al.: 23rd International Cosmic Ray Conference, 1993, Vol. 1, p.89; (<http://adsabs.harvard.edu/abs/1993ICRC....1...89N>)
13. "Calibration of an Algorithm for Overlapping Pulses in Gamma-Ray Bursts", Davis, S.P., Norris, J.P., et al.: AIP Conference Proceedings 280, eds: M. Friedlander, N. Gehrels, Daryl J. Macomb, 1992, p.964
14. "Deconvolution of Pulses in Bright Gamma-Ray Bursts", Norris, J.P., Davis, S.P., et al.: AIP Conference Proceeding 280, eds: M. Friedlander, N. Gehrels, Daryl J. Macomb, 1992, p.959
15. "Deconvolution of Pulse Structures in Gamma-Ray Bursts Observed by BATSE", Davis, S. P., Norris, J.P., et al.: Bull. AAS. 23, 1323 (1992)

INTERNET PUBLICATION: On line Astrophysics: A Century of Great Discoveries:
<http://heseweb.nrl.navy.mil/gamma/dap-aps/astro/index.htm>;

Presentations At Professional Meetings And Colloquia:

1. S. P. Davis, Simulations of Energy Transfer in Gamma-ray Bursts via Laser Irradiation on CH-H⁺ Foil, Invited Speaker, International Center for Relativistic Astrophysics Network, Pescara, Italy, June 28, 2010
2. S. P. Davis Proton Beam Instability Simulations of Energy Transfer in Gamma-ray Bursts via Laser Irradiation on CH-H⁺ Foil, GDRE Gamma-ray Burst School, Carghese, Corsica, France, May 17-22, 2010

Gadri Mohamed



Position: Teaching staff member in physics department since 1983

Period covered: 33 years

Scientific Work

Writing books, publishing many papers, in solid state physics, in Astrophysics named binary stars and mass transfer.

Conferences and educational activities

I have participated in almost MG conferences and **ICRAnet** activities

2016 List of Publication

Nil

ALEXANDER GALLEGO CADAVID

EMAIL: alexander.gallego@udea.edu.co

PERSONAL DATA

EMAILS: alexander.gallego@udea.edu.co, gausstein@gmail.com
INSTITUTE: Institute of Physics, University of Antioquia, Colombia
INVESTIGATION GROUPS: Group of Phenomenology of Fundamental Interactions (GFIF)
and Group of Cosmology and Gravitation (CosmoGrav)
ADDRESS AND PHONE: Street 67 N 53-108 Office 6-105 Medellín, Colombia - Tel. +57-4-219 5630

EDUCATION

JULY 2014 to present PhD student in PHYSICS, **University of Antioquia**, Colombia
Project: "Effects of features in the inflaton potential on the spectrum and
bispectrum of primordial curvature perturbations" | Advisor: Ph.D. Antonio E. ROMANO

DECEMBER 2013 Master of Science in PHYSICS, **University of Antioquia**, Colombia
Thesis: "Primordial non-Gaussianities produced by features in the potential of
single slow-roll inflationary models" | Advisor: Ph.D. Antonio E. ROMANO

DECEMBER 2007 Bachelor's degree in PHYSICS **University of Antioquia**, Colombia
Thesis: "Cosmological singularity theorems" | Advisor: Ph.D. Daniel JARAMILLO

RESEARCH ACTIVITIES

Scholarship

JULY 2014 - TO PRESENT Colciencias Scholarship Doctoral Program

Internships

SEP. 2013 - DEC. 2013 Development of a computational code to study the effects of a general class of features of the inflaton potential on the spectrum and bispectrum of primordial curvature perturbations

FEB. 2011 - JUNE 2012 Development of a computational code to calculate the spectrum and bispectrum of cosmological perturbations in cosmological inflation

Scientific Events and Projects

NOV. 2 2016 TO APR. 30 2017 Visiting Student at ICRANet
The International Center for Relativistic Astrophysics Network (ICRANet), Pescara and Rome, Italy

SEP. 28 TO SEP. 30, 2016 70 & 70 Fiesta de Gravitación Clásica y Cuántica
Conference presentation
Universidad Tecnológica de Bolívar, Cartagena, Colombia

NOV. 30 TO DEC. 20, 2015 International Collaboration
Yukawa Institute for Theoretical Physics
Kyoto University, Japan

DEC 7-11, 2015 The 25th Workshop on General Relativity and Gravity in Japan
Poster presentation
Kyoto University, Kyoto, Japan

NOV 17-21, 2015 Andean School on Gravity and Cosmology
Poster presentation
Universidad de los Andes, Bogotá, Colombia

MAY 18-22, 2015 Workshop on Current Challenges in cosmology
Poster presentation
Universidad del Valle, Cali, Colombia

DEC. 1-12, 2014 School and Workshop on Observational Cosmology
Poster presentation
ICTP-Trieste/ICTP-SAIFR, Sao Paulo, Brazil

NOV. 24-28, 2014 The Latin American Symposium on High Energy Physics
Poster presentation
SILAFEA, Medellín, Colombia

NOV. 5-7, 2007 International Congress on Relativity and Gravitation Grav07
Universidad Nacional de Córdoba, Córdoba, Argentina

LANGUAGES

SPANISH: Mother tongue

ENGLISH: Fluent

COMPUTER SKILLS

Basic Knowledge: C and C++

Intermediate Knowledge: MATHEMATICA and PYTHON

RESEARCH INTERESTS

Theoretical and observational cosmology, Cosmic inflation, General Relativity, Anisotropies in the CMB radiation, Non-gaussianities in the CMB and Effects of features in the potential of inflationary models on the spectrum and bispectrum of primordial curvature perturbations.

PUBLICATIONS

- Effects of discontinuities of the derivatives of the inflaton potential. Eur. Phys. J. C (2015) 75:589, arXiv:1404.2985.
- Effects of features in the inflaton potential on the spectrum and bispectrum of primordial curvature perturbations. Nucl.Part.Phys.Proc. 267-269 (2015) 254-256
- Effects of local features of the inflaton potential on the spectrum and bispectrum of primordial perturbations. Eur. Phys. J. C (2016) 76:385, arXiv:1508.05687v1.

TEACHING EXPERIENCE

AT THE UNIVERSITY OF ANTIOQUIA

JUL 2009-JUN 2014	Laboratory of Wave Mechanics and Electromagnetism
JUL 2008-JUN 2013	Laboratory of Physical Mechanics
JUL-DEC 2013 JUL-DEC 2010	Introductory Physics
JUL-DEC 2011 JUL-DEC 2012	Mechanics
JUL 2008-DEC 2010	Biophysics I and Laboratory

AT THE METROPOLITAN INSTITUTE OF TECHNOLOGY

JAN 2012-JUN 2014	Physical Mechanics
JAN 2012-JUN 2014	Laboratory of Physical Mechanics
FEB 2014-JUN 2014	Differential Calculus
FEB-JUN 2012	Statics and Dynamics

Goulart Coelho Jaziel

Position: Postdoc
Period covered: 2014-2015



I Scientific Work

Compact objects: SGRs/AXPs, white dwarfs and neutron stars

Work With Students (ICRANet):

Thermal X-ray emission from massive, fast rotating, highly magnetized white dwarfs

Diego L. Cáceres, Jaziel G. Coelho, S. M. de Carvalho, R. C. R. de Lima , Jorge A. Rueda , Remo Ruffini

Work With Postdocs:

On the rotation-power nature of SGRs and AXPs

Jaziel G. Coelho, R. C. R. de Lima, Diego L. Cáceres, M. Malheiro, Jorge A. Rueda , Remo Ruffini

2015 List of Publication

Particle acceleration and radio emission for SGRs/AXPs as white dwarf pulsars. Journal of Physics. Conference Series (Online), v. 630, p. 012015, 2015.

Lobato, R. V. ; Coelho, Jaziel ; Malheiro, M.

Fermionic matter under the effects of high magnetic fields and its consequences in white dwarfs. Journal of Physics. Conference Series (Print), v. 630, p. 012039, 2015.

Otoniel, E.; Malheiro, M ; Coelho, J. G.

Do SGRs/AXPs and radio AXPs have the same nature? In: Proceedings of the MG13 Meeting on General Relativity, 2015, Stockholm University. The Thirteenth Marcel Grossmann Meeting. p. 2465-2467.

Coelho, J. and Malheiro, M.

Magnetic fields of SGRs/AXPs as rotation-powered massive white dwarfs. In: Proceedings of the MG13 Meeting on General Relativity, 2015, Stockholm University. The Thirteenth Marcel Grossmann Meeting. p. 2462-2464.

Malheiro, M. and Coelho, J.

Thermal X-ray emission from massive, fast rotating, highly magnetized white dwarfs – (ready for submission to ApJ)

Diego L. Cáceres, Jaziel G. Coelho, S. M. de Carvalho, R. C. R. de Lima, Jorge A. Rueda, Remo Ruffini

On the rotation-power nature of SGRs and AXPs – (submitted to ApJ)

Jaziel G. Coelho, R. C. R. de Lima, Diego L. Cáceres, M. Malheiro, Jorge A. Rueda, Remo Ruffini

Marcelo Moraes Guzzo

Position: Bolsista de Produtividade em Pesquisa do
CNPq - Nível 1C - CA FA - Física e Astronomia



I Scientific Work

1. Física de partículas e campos
2. Física e astrofísica de neutrinos

II Conferences and educational activities

1. GUZZO, M. M.. A Partícula de Higgs: da Necessidade à Descoberta. 2013. (Apresentação de Trabalho/Conferência ou palestra).
2. Guzzo, M.M.. Café com Química: neutrinos. 2013. (Apresentação de Trabalho/Outra).
3. Guzzo, M.M.. UNICAMP Itinerante: Partículas Elementares. 2013. (Apresentação de Trabalho/Seminário).
4. Guzzo, M.M.. Introdução à Partículas Elementares. 2012. (Apresentação de Trabalho/Seminário).
5. Guzzo, M. M.. Convite à Física - USP. 2012. (Apresentação de Trabalho/Seminário).
6. GUZZO, M. M.. O Discreto, Charmoso e Estranho Mundo das Partículas Elementares. 2011. (Apresentação de Trabalho/Seminário).
7. GUZZO, M. M.. Neutrinos: partículas fantasmas. 2011. (Apresentação de Trabalho/Seminário).
8. GUZZO, M. M.. Introdução ao Modelo Padrão das Partículas Elementares. 2011. (Apresentação de Trabalho/Seminário).
9. GUZZO, M. M.. Sondando fundamentos da Física através do fenômeno de oscilações de neutrinos. 2010. (Apresentação de Trabalho/Outra).
10. GUZZO, M. M.. Partículas Elementares: Belas, Estranhas e Charmosas. 2006. (Apresentação de Trabalho/Seminário).
11. GUZZO, M. M.. Física de Partículas. 2005. (Apresentação de Trabalho/Seminário).
12. GUZZO, M. M.. Encerramento do Ano Internacional da Física: Neutrinos. 2005. (Apresentação de Trabalho/Seminário).
13. GUZZO, M. M.. Neutrinos: Pesando as Partículas Fantasmas. 2005. (Apresentação de Trabalho/Seminário).

III. Service activities

III a. Within ICRANet

III b. Outside ICRANet

IV. Other

1. 1o. Encontro do CCT da UNIFAL.Nobel de Física 2015: oscilações de neutrinos. 2015. (Seminário).
2. Nobel de Física 2015: oscilações de neutrinos.Nobel de Física 2015: oscilações de neutrinos. 2015. (Seminário).
3. Semana de Cursos de Licenciatura Física e Matemática UFSCar.Nobel de Física 2015: oscilações de neutrinos. 2015. (Seminário).
4. Semana de Cursos de Licenciatura Física e Matemática UFSCar. O estarnho mundo das partículas elementares. 2014. (Congresso).
5. Colóquio do IFGW.Nobel de Física de 2013: A origem da massa das partículas elementares. 2013. (Seminário).
6. Curso de Verão.Partícula de Higgs: da Necessidade à Decoberta. 2013. (Seminário).
7. Aula Magna Inaugural do Curso de Física do IFSC USP.Neutrino: partícula misteriosa, onipresente e... superluminar?. 2012. (Seminário).
8. Colóquio do Instituto de Física Gleb Wataghin.Evidências da descoberta da partícula de Higgs. 2012. (Seminário).
9. Parainfo da Turma de Bacharelado em Física.Parainfo da Turma de Bacharelado em Física. 2012. (Outra).

2016 List of Publication

1. Guzzo, M.M.; PEIXOTO, C. F. ; de Holanda, P. C. . Cosmological bounds of sterile neutrinos in a $SU(3)_C \otimes SU(3)_L \otimes SU(3)_R \otimes U(1)_N$ model as dark matter candidates. Brazilian Journal of Physics (Impresso), v. 1, p. 1, 2016.
2. Guzzo, M.M.; PERES, O. L. G. ; PICORETI, R. . Neutrino Decay and Solar Neutrino Seasonal Effect. Physics Letters. B (Print), v. 1, p. 1, 2016.
3. GUZZO, MARCELO M.; DE HOLANDA, PEDRO C. ; OLIVEIRA, ROBERTO L.N. . Quantum dissipation in a neutrino system propagating in vacuum and in matter. Nuclear Physics. B (Print), v. 1, p. 1, 2016.
4. ZAVANIN, E.'M. ; GUZZO, M.'M. ; DE HOLANDA, P.'C. ; PERES, O.'L.'G. . Confronting the stochastic neutrino mixing mechanism with the sterile neutrino hypothesis as a solution to the short

baseline neutrino anomalies. Physical Review. D, Particles, Fields, Gravitation, and Cosmology, v. 91, p. 1, 2015.

5. GIRARDELLI, DAVID ; GUZZO, MARCELO . Neutrino Non-standard Interactions. Physics Procedia, v. 61, p. 704-707, 2015.

6. GIRARDELLI, DAVID ; ZAVANIN, EDUARDO M. ; GUZZO, MARCELO M. . Equivalência entre a mecânica quântica e a mecânica quântica PT simétrica. Revista Brasileira de Ensino de Física (Online), v. 37, p. 1304, 2015.

7. OLIVEIRA, R.'L.'N. ; GUZZO, M.'M. ; DE HOLANDA, P.'C. . Quantum dissipation and CP violation in MINOS. Physical Review. D, Particles, Fields, Gravitation, and Cosmology, v. 89, p. 1-9, 2014.

Citações:2

8. ESMAILI, A. ; GRATIERI, D. ; HOLANDA, P.C. ; Peres, O L G ; VALDIVIESSO, G.A. ; GUZZO, M. M. . Constraining the violation of the equivalence principle with IceCube atmospheric neutrino data. Physical Review. D, Particles, Fields, Gravitation, and Cosmology, v. 89, p. 113003, 2014.

Citações:3

9. GUZZO, M. M.; Oliveira, R. L. N. . Dissipation and θ_{13} in neutrino oscillations. European Physical Journal. C, Particles and Fields (Print), v. 73, p. 1-9, 2013.

Citações:2

10. GUZZO, M. M.; HOLANDA, P. C. de ; de Holanda, P. C. ; PERES, O. L. G. ; ZAVANIN, E. M. . Stochastic neutrino mixing mechanism. Physical Review. D, Particles, Fields, Gravitation, and Cosmology, v. 87, p. 093003, 2013.

Citações:1

11. F. R. Torres ; GUZZO, M. M. ; HOLANDA, P. C. ; PERES, O. L. G. . A New Parametrization of Mass Varying Neutrinos Applied in Supernovae. Nuclear Physics. B, Proceedings Supplement (Print), v. 1, p. 1-2, 2012.

12. VALDIVIESSO, G.A. ; Guzzo, M.M. ; HOLANDA, P.C. . Equivalence Principle from the Solar and Reactor Neutrino Observations. Nuclear Physics. B, Proceedings Supplement (Print), v. 229-232, p. 452, 2012.

13. VALDIVIESSO, G. ; GUZZO, M. M. ; HOLANDA, P. C. . Probing New Limits for the Violation of the Equivalence Principle in the Solar-Reactor Neutrino Sector as a Next to Leading Order Effect. Physics Letters. B (Print), v. 1, p. 1-5, 2011.

Citações:1 | 1

14. D.V. Forero ; Guzzo, M. M. . Constraining Non-Standard Interactions with Electrons. Physical Review. D, Particles, Fields, Gravitation, and Cosmology, v. 1, p. 1-1, 2011.

15. F. R. Torres ; GUZZO, M. M. ; Holanda, P C de ; Peres, O L G . Mass varying neutrinos in supernovae. Physical Review. D, Particles, Fields, Gravitation, and Cosmology, v. 1, p. 1-1, 2011.

Citações:2|2

16. Bernardini, A.E. ; Guzzo, M.M. ; Nishi, C.C. . Quantum flavor oscillations extended to the Dirac theory. Fortschritte der Physik (Berlin. Wiley-VCH), v. 59, p. 372-453, 2011.

Citações:4|4

17. Oliveira, R. L. N. ; GUZZO, M. M. . Quantum dissipation in vacuum neutrino oscillation. European Physical Journal C, p. 1, 2010.

Citações:4|4

18. F. R. Torres ; Guzzo, M. M. ; Holanda, P C de . R-process and mass varying neutrinos. Journal of Physics. Conference Series (Print), v. 203, p. 1, 2010.

Citações:1

19. Guzzo, M. M.; F. R. Torres . Neutrinos de Massa Variável. Physicae (APGF), v. 9, p. 1, 2010.

20. C. A. Moura Jr. ; GUZZO, M. M. . New analyses of Double-Bang Events in the Atmosphere. Brazilian Journal of Physics, v. 38, p. 219-226, 2008.

Hoang Ngoc Long

Position: Head of Particle Physics section, Graduate School, Institute of Physics

Vietnamese Academy of Science and Technology

Period covered: From 2000 --- now



I. Scientific Work (6 papers)

L. T. Hue, A. B. Arbuzov, N. T. K. Ngan, and **H. N. Long**: Probing Neutrino and Higgs sectors in $SU(2)_1 \times SU(2)_2 \times U(1)_Y$ model with lepton-flavor non-universality, Eur. Phys. J. C 77, No 5, (2017) 346 (20 pages). DOI: 10.1140/epjc/s10052-017-4866-x,

II. Conferences and educational activities

II a. Conferences and Other External Scientific Works:

- Editor of journal of Vietnam: **Communications in Physics**.

II b. Work With Students: I give lectures on Quantum Field Theory for Undergraduate students, Hanoi University of Education, Standard Model for Graduate students, Can Tho University

II c. Diploma thesis supervision: I am supervisor for 5 Ph. D. students and 6 Master Students.

II d. Other Teaching Duties: I am a referee for some Ph. D. Theses.

II e. Work With Postdocs: Now I work with Postdoc: D. T. Huong and L. T. Hue

III. Service activities

III a. Within ICRANet: I hope to visit ICRANET next year 2016

III b. Outside ICRANet:

IV. Other I am referee for some International Journal such as: Phys. Rev. D, Physics Letters B, Int. J. Mod. Phys. A,...

CURRICULUM VITAE AND LIST OF PUBLICATIONS

GERT HÜTSI

Tartu Observatory
61602 Tõravere, Tartumaa
Estonia
Tel: +372 53 566 278
gert@aai.ee

PERSONAL DATA

Date of birth: 3 January 1975
Place of birth: Tallinn, Estonia
Nationality: Estonian

EDUCATION AND CAREER

Oct. Nov. 2009 – present	Research associate at <i>Tartu Observatory</i>
Oct. 2006 – Oct. 2009	Postdoc at <i>University College London</i>
Feb. 2006 – Oct. 2006	Postdoc at <i>Max-Planck-Institut für Astrophysik</i>
Sept. 2002 – Feb. 2006	Research for Ph.D. at <i>Max-Planck-Institut für Astrophysik</i> Thesis title: “Cosmic sound: Measuring the Universe with baryonic acoustic oscillations” Supervisor: Prof. Rashid Sunyaev Thesis defence: 30.05.2006 at <i>Ludwig-Maximilians-Universität München</i>
Sept. 1998 – June 2000	M.Sc. in Theoretical Physics at <i>University of Tartu</i> Thesis title: “Models with a steplike initial spectrum and large-scale structure of the Universe” Supervisor: Dr. Mirt Gramann
Jan. 1996 – July 1996	Study and research at <i>Uppsala University</i> as an exchange student
Sept. 1994 – June 1998	Diploma (B.Sc.) in Physics at <i>University of Tartu</i> Thesis title: “The mass function and peculiar velocities of galaxy clusters in various cosmological models” Supervisor: Dr. Mirt Gramann

PUBLICATIONS

Refereed Publications

- Implications of the Fermi-LAT diffuse gamma-ray measurements on annihilating or decaying Dark Matter
Hütsi, G., Hektor, A., Raidal, M., arXiv:1004.2036, *JCAP* accepted (2010)
- Power spectrum of the maxBCG sample: detection of acoustic oscillations using galaxy clusters
Hütsi, G., *MNRAS* 401, 2477 (2010)

- Constraint on the growth factor of the cosmic structure from the damping of the baryon acoustic oscillation signature
Nakamura, G., **Hütsi, G.**, Sato, T., Yamamoto, K., *Phys Rev. D* 80, 123524 (2009)
- Constraints on leptonically annihilating Dark Matter from reionization and extragalactic gamma background
Hütsi, G., Hektor, A., Raidal, M., *A&A* 505, 999 (2009)
- Confronting the damping of the baryon acoustic oscillations with observation
Nomura, H., Yamamoto, K., **Hütsi, G.**, Nishimichi, T., *Phys Rev. D* 79, 063512 (2009)
- The cluster-galaxy cross spectrum. An additional probe of cosmological and halo parameters
Hütsi, G., Lahav, O., *A&A* 492, 355 (2008)
- Testing General Relativity with the Multipole Spectra of the SDSS Luminous Red Galaxies
Yamamoto, K., Sato, T., **Hütsi, G.**, *Prog. Theor. Phys.* 120, 609 (2008)
- Power spectrum of the SDSS luminous red galaxies: constraints on cosmological parameters
Hütsi, G., *A&A* 459, 375 (2006)
- Acoustic oscillations in the SDSS DR4 Luminous Red Galaxy sample power spectrum
Hütsi, G., *A&A* 449, 891 (2006)
- Clustering of SZ clusters on a past light-cone: acoustic oscillations and constraints on dark energy
Hütsi, G., *A&A* 446, 43 (2006)
- Clusters of galaxies in the microwave band: influence of the motion of the Solar System
Chluba, J., **Hütsi, G.**, Sunyaev, R.A., *A&A* 434, 811 (2005)
- Clusters and superclusters in the Las Campanas redshift survey
Einasto, J., Einasto, M., **Hütsi, G.** et al., *A&A* 410, 425 (2003)
- Clusters and superclusters in the Sloan Digital Sky Survey
Einasto, J., **Hütsi, G.**, Einasto, M. et al., *A&A* 405, 425 (2003)
- A primordial feature at the scale of superclusters of galaxies
Gramann, M., **Hütsi, G.**, *MNRAS* 327, 538 (2001)
- Cold dark matter models with a step-like initial power spectrum
Gramann, M., **Hütsi, G.**, *MNRAS* 316, 631 (2000)

Other

- Power spectrum of the maxBCG cluster sample: new evidence for the acoustic features
Hütsi, G., arXiv:0705.1843 (2007)
- Cosmic sound: Measuring the Universe with baryonic acoustic oscillations
Hütsi, G., Ph.D. thesis, *Ludwig-Maximilians-Universität München* (2006)
- Acoustic oscillations in the SDSS Luminous Red Galaxy sample power spectrum
Hütsi, G., astro-ph/0507678 (2005)
- Luminosity function and density field of the Sloan and Las Campanas Redshift Survey
Hütsi, G. et al., astro-ph/0212327 (2002)

Kim, Hyeong-Chan



Position: Professor, School of Liberal Arts and Sciences,
Korea University of transportation,
Period covered: 2009- present

I Scientific Work

II Conferences and educational activities

II a Conferences and Other External Scientific Work

II b Work With Students

II c Diploma thesis supervision

II d Other Teaching Duties

II e. Work With Postdocs

2016 List of Publication

Equation of state in the presence of gravity, arXiv:1608.03409, to appear in JKPS

Preprints:

Classifying self gravitating radiations, arXiv:1601.02720, submitted to PRD

The M-sigma Relation of Super Massive Black Holes from the Scalar Field Dark Matter:
arXiv:1512.02351, submitted to JHEP

Static Fluid Blackholes, arXiv:1610.04087, submitted to Phys. Lett. B.

Matter Equation of State in General Relativity, arXiv:1611.00452 .

Kim, Jin Young

Position: professor

Period covered:

I Scientific Work

II Conferences and educational activities

II a Conferences and Other External Scientific Work

II b Work With Students

II c Diploma thesis supervision

II d Other Teaching Duties

II e. Work With Postdocs

III. Service activities

III a. Within ICRANet

III b. Outside ICRANet

IV. Other

2016 List of Publication

J.Y. Kim and M.-I. Park, On a new approach for constructing wormholes in Einstein-Born-Infeld gravity, arXiv. 1608.00445 (to appear Eur. Phys. J. C)

J. Y. Kim, Wormhole solution in non-standard theory of general relativity, New Physics: Sae Mulli, 66, 82 (2016)

Malheiro Manuel



Position: Full Professor

Period covered: 07/2013 to 11/2014

I Scientific Work

Research on neutron stars and white dwarfs, on gravitational waves and nuclear physics.

II Conferences and educational activities

II a Conferences and Other External Scientific Work

II b Work With Students – advising 2 master students and 2 Phd Students

II c Diploma thesis supervision

Jaziel Goulart Coelho. - Magnetares e os Pulsares de Anãs Brancas. 2013. - Phd Thesis concluded December/2013 - Instituto Tecnológico de Aeronáutica, São José dos Campos, Brazil

II d Other Teaching Duties - Teaching: Graduate course on Mathematical Physics at ITA, Brazil.

III. Service activities

III a. Within ICRANet – research on magnetic white dwarfs and published an article together. Meetings with the director of ICRANet and the scientific board in ICRANet-CBPF (2014)

III b. Outside ICRANet – Talk “From Nuclei to Stars” in Fisweek of UNICAMP, Campinas 10/2014 and III Semana Acadêmica da Física UFSC – Florianópolis 09/2014, for undergraduate physics students

2014 List of Publication

1. COELHO, J. G., **MALHEIRO, M.**, Rueda, J. A., Ruffini, R.

Dynamical Instability of White Dwarfs and Breaking of Spherical Symmetry under the Presence of Extreme Magnetic Fields. The Astrophysical Journal Volume 794, Issue 1, article id. 86, 7 pp. (2014).

2. CONSTANCIO JR, M. AGUIAR, O., KEISER, G., **MALHEIRO, M.**, and LEMOS, L.J.R.

Do coupled nested pendula have the same eigenfrequencies as pendula in cascade? Journal of Instrumentation, Volume 9, Issue 08, article id. T08006 (2014). Technical Report, 2014

3. ALBERTO, P.; CASTRO, A.; FIOLHAIS, M.; LISBOA, R.; MALHEIRO, M.

Relativistic pseudospin and spin symmetries in physical systems - recent results

Journal of Physics: Conference Series, Volume 490, Issue 1, article id. 012069 (2014).

4. COELHO, J. G., **MALHEIRO, M.**

Magnetic dipole moment of soft gamma-ray repeaters and anomalous X-ray pulsars described as massive and magnetic white dwarfs. Publications of the Astronomical Society of Japan. , v.66, p.1 - 14, 2014.

5. LOURENCO, O., DUTRA, M., FREDERICO, T., DELFINO, A., **MALHEIRO, M.**

Influence of pions on the hadron-quark phase transition. AIP Conference Proceedings. , v.1529, p.241 - 243, 2013.

6. DUTRA, M., LOURENÇO, O., DELFINO, A., FREDERICO, T., **MALHEIRO, M.**

Polyakov-Nambu-Jona-Lasinio phase diagrams and quarkyonic phase from order parameters. Physical Review. D, Particles, Fields, Gravitation, and Cosmology., v.88, p.114013 - , 2013.

7. COELHO, J. G., **MALHEIRO, M.**

SGRs and AXPs as white dwarf pulsars. AIP Conference Proceedings. , v.1520, p.258 - 263, 2013.

CURRICULUM VITAE

1 Personal Information:

Name: Moliné, Maria de los Angeles
Citizenship: Argentinean
Date of birth: March 9, 1980
Sex: Female
Marital status: Married
E-mail: maria.moline@ist.utl.pt

2 Education

2.1 Ph.D. thesis

Title: “*Extragalactic dark matter annihilation signals and halo substructure properties*”
Post Graduate: Ph.D., Astroparticle Physics and Cosmology
Date: March 2016
Institution: Centro de Física Teórica de Partículas,
Instituto Superior Técnico, Universidade Técnica de Lisboa
City: Lisbon, Portugal
Supervisor: Dr. Sergio Palomares-Ruiz
Co-supervisor: Dr. David Emmanuel-Costa.

2.2 Bachelor thesis

Title: “*Dependence of the primary abundances with the Higgs vacuum expectation value*”
Grade: Ms.S. in Astronomy
Date: October, 2010
Institution: Facultad de Ciencias Astronómicas y Geofísicas,
Universidad Nacional de La Plata
City: La Plata, Buenos Aires, Argentina
Supervisor: Dr. Osvaldo Civitarese
Co-supervisor: Dr. Mercedes Mosquera.

3 Scientific Publications

- **The 21 cm signal and the interplay between dark matter annihilations and astrophysical processes**
Laura Lopez-Honorez, Olga Mena, Ángeles Moliné, Sergio Palomares-Ruiz, Aaron C. Vicent.
JCAP **1608** (2016) no.08, 004. [[arXiv:1603.06795](#)].
- **Characterization of the subhalo internal structure and implications for dark matter annihilation signals**
Ángeles Moliné, Miguel A. Sánchez-Conde, Sergio Palomares-Ruiz, Francisco Prada.
MNRAS (2017) stx026. [[arXiv:1603.04057](#)].
- **Isotropic extragalactic flux from dark matter annihilations: lessons from non standard dark matter scenarios**
Ángeles Moliné, Jascha Schewtschenko, Sergio Palomares-Ruiz, Céline Boehm and Carlton Baugh.
JCAP **1608** (2016) no.08, 069. [[arXiv:1602.07282](#)].
- **Future sensitivity of neutrino telescopes to dark matter annihilations from the cosmic neutrino signal**
Ángeles Moliné, Alejandro Ibarra, Sergio Palomares-Ruiz.
JCAP **1506** (2015) 06, 005. [[arXiv:1412.4308](#)]
- **Cosmological bounds to the variation of the Higgs vacuum expectation value: BBN constraints**
Osvaldo Civitarese, Ángeles Moliné, Mercedes E. Mosquera.
Nucl.Phys. **A846** (2010) 157-173. [[hep-ph/874248](#)]

4 Research grants and Scholarships

- Post-doctoral research fellowship from Instituto de Astrofísica e Ciências do Espaço, Lisbon, Portugal. Dates: from January 2017 to present.
- Research Grant from “RAICES” Program, Argentina. Dates: from August to December 2016.
- Research Grant Contract from CFTP, IST, Portugal. Dates: from May to August 2016.
- Graduate Fellowship from FCT-IDPASC, Portugal. Dates: from July 2011 to June 2015. Supervised by Dr. Sergio Palomares-Ruiz and Dr. David Emmanuel-Costa. I have obtained one of the few fellowships awarded.
<http://www.idpasc.lip.pt>

- Graduate Fellowship Type I from CONICET, Argentina. Dates: April 2011 to June 2011. Supervised by Dr. Osvaldo Civitarese.
- Undergraduate Fellowship from Facultad de Ciencias Astronómicas y Geofísicas, Universidad Nacional de la Plata, Buenos Aires, Argentina. Dates: April 2004 to March 2008. Supervised by Dr. Hector Vucetich.

5 Academic Visits

- Visitor at the Instituto de Física Corpuscular (IFIC), CSIC-Universitat de València, Spain, collaborating with Dr. Sergio Palomares-Ruiz in several dark matter projects. Dates: October 1, 2015 to April 1, 2016.
- Visitor at the Institute for Particle Physics Phenomenology (IPPP), Durham University, UK, collaborating with Dr. Céline Boehm in the subject of astrophysical predictions from dark matter-radiation interactions. Dates: November 10, 2014 to March 10, 2015.
- Visitor at the Kavli Institute for Particle Astrophysics and Cosmology (KIPAC), SLAC, Stanford, USA, collaborating with Dr. Miguel Ángel Sánchez-Conde in the subject of CDM halo substructure. Dates: May 1, 2014 to July 31, 2014.

6 Talks

- *“Extragalactic dark matter annihilation signals and halo substructure properties”*
IATE Seminar, Instituto de Astronomía Teórica y Experimental/Universidad de Córdoba, Argentina. October 28, 2016.
- *“CDM subhalo concentrations and implications for DM annihilation signals”*
MultiDark Galaxies Workshop, La Plata, Argentina, September 28, 2016.
- *“Characterization of the subhalo internal structure and implications for dark matter annihilation signals”*
FRIP talk (open talk to non-LAT people), KIPAC/SLAC, Stanford, Menlo Park, USA, July 28, 2014.
- *“Constraints on dark matter annihilation from the cosmic diffuse neutrino signal”*
CAT Doctoral Program in Physical IST Seminar, Instituto Superior Técnico/ Universidade de Lisboa, Portugal, January 17, 2014.

- “*Cosmological Dark Matter Annihilations*”
1st IDPASC PhD Students Workshop, University of Coimbra, Portugal, October 13, 2012.
- “*Indirect Dark Matter detection*”
IDPASC Dark Matter School, University of Evora, Portugal, December 15, 2011.

7 Research projects

- Member of the Portuguese Research Project “*Strategic Project - UI 777*”, PEst-OE/FIS/UI0777/2013(January 2013-December 2014).
- Member of the Portuguese Research Project “*Neutrino Physics*”, PTDC/FIS-NUC/0548/2012(July 2013-June 2015).
- Member of the Portuguese Research Project “*Physics Beyond the Standard Model in the Era of the LHC*”, CERN/FP/123580/2011(June 2012-June 2014).

8 Schools and Courses

- September 29 - October 4, 2016 “*Galaxy Formation and Evolution*”, Facultad de Ciencias Astronómicas y Geofísicas, Universidad de La Plata, Argentina.
- 22-26 April 2013, “*Workshop on dark matter tools and Hands-on Fermi analysis*”, IFIC-Valencia, Spain.
- August 27 - September 6, 2012 “*2nd ITN School on Unification in the era of LHC*”, IFIC-Valencia, Spain.
- 14-18 December 2011, “*IDPASC Dark Matter School*”, University of Evora, Portugal.
- 24-28 October 2011, “*Statistics Course*”, LIP-Lisboa, Portugal.

9 Conferences and Workshops

- 26-30 September 2016, MultiDark Galaxies Workshop, La Plata, Argentina.
- 7-9 January 2015, YETI 2015, IPPP-Durham, England.
- 10-11 April 2014, “*Dark Ghosts*”, IFIC-Valencia, Spain.

- 3-7 December 2012, “*Discrete 2012-Third Symposium on Prospects in the Physics of Discrete Symmetries*”, IST-Universidade Técnica de Lisboa, Portugal.
- 12-15 October 2012, “*1st IDPASC PhD Students Workshop*”, University of Coimbra, Portugal.
- 21-24 September 2009, “*52th Reunión Anual de la Asociación Argentina de Astronomía*”, La Plata, Buenos Aires, Argentina.
- 13-17 April 2009, “*Grav09*”, La Falda, Córdoba, Argentina.
- 20-23 September 2006, “*49th Reunión Anual de la Asociación Argentina de Astronomía*”, Capilla del Monte, Córdoba, Argentina.

10 Teaching experience:

- Student Assistant. Undergraduate Course: “*Algebra, Numerical Calculus and Analytic Geometry*”, Facultad de Ciencias Exactas, Universidad Nacional de La Plata, Buenos Aires, Argentina. Dates: April 2010 to May 2011.
- Student Assistant. Undergraduate Course: “*Calculus III*”, Facultad de Ingeniería, Universidad Nacional de La Plata, Buenos Aires, Argentina. Dates: March 2008 to May 2011.
- Student Assistant. Undergraduate Course: “*Algebra, Numerical Calculus and Analytic Geometry*”, Facultad de Ciencias Exactas, Universidad Nacional de La Plata, Buenos Aires, Argentina. Dates: April 2006 to March 2010.
- Student Assistant. Introductory Course: “*Mathematics for Engineer beginner students*”, Facultad de Ingeniería, Universidad Nacional de La Plata, Buenos Aires, Argentina. Dates: From January 21, 2008 to February 29, 2008.
- Private lessons of Mathematics and Physics for University level students. Dates: 2006 to 2010.

11 Administrative experience:

- Member of the Academic Council on representation of Students, Facultad de Ciencias Astronómicas y Geofísicas (UNLP)
Period: April 2005 to March 2007.

- Member of the advisory committee to assign teachers in the Facultad de Ciencias Astronomicas y Geofisicas, Universidad Nacional de la Plata, in the following areas:
 - Classical Mechanics (2008)
 - General Astronomy (2006)
 - Spherical Astronomy (2006)

12 Observing experience

- La Plata Observatory, VSN 0.8-m Telescope, 2005-2006 (one night a week during one year), as member of the η Carinae Observing Group, 'Optical monitoring of η Carinae'. The project was based on differential photometry with CCD.

13 Computer Skills:

- Programming languages: FORTRAN 77/90, C, C++, Python
- Selected software: Mathematica, Science Fermi Tools, LanHEP/MicrOmegas, IRAF, \LaTeX

14 Languages:

Spanish: Mother tongue.

English: Speak, read and write English.

Portuguese: Speak, read and write Portuguese.

15 Referees Contact Information

- **Dr. Sergio Palomares-Ruiz**
Instituto de Física Corpuscular (IFIC), CSIC-Universitat de València
E-mail address: Sergio.Palomares.Ruiz@ific.uv.es
- **Dr. Miguel A. Sánchez-Conde**
Oskar Klein Centre for Cosmoparticle Physics, Stockholm University
E-mail address: sanchezconde@fysik.su.se
- **Prof. Jorge C. Romão**
Centro de Física Teórica de Partículas, Instituto Superior Técnico,
Universidade Técnica de Lisboa
E-mail address: jorge.romao@tecnico.ulisboa.pt
- **Dr. Céline Boehm**
Institute for Particle Physics Phenomenology (IPPP), Durham University,
Durham DH1 3LE, UK
E-mail address: c.m.boehm@durham.ac.uk
- **Dr. Olga Mena**
Instituto de Física Corpuscular (IFIC), CSIC-Universitat de València
E-mail address: omena@ific.uv.es

Motie Iman

Position: Ph.D Student of physics
Period covered: 6 months



I. Scientific Work

I worked in Iran on:

- 1- Generation of circular polarization of CMB where published in PRD
- 2- Beta function in Lorentz violation theory (my calculation were finished and nowadays it will publish)
- 3- Electron electric dipole moment in standard model extension. (My calculation was finished and I am writing this paper)

II. Educational activities

II c. Diploma thesis supervision
Prof. M. Haghighat

III. Service activities

III a. Within ICRANet

Here I am working with prof. Xeu on:

- 1- generation of circular polarization of the CMB via Euler -Heisenberg Lagrange
- 2- neutrino physics

Moreover, I am working with prof. Vereshchagin on thermal equilibrium of the pair plasma.

2010 Publication

Generation of circular polarization of the CMB
Phys.Rev.D81:084035, 2010

Nagataki Shigehiro

Research interest:

- Central engine of gamma-ray bursts and formation of relativistic jet.
- Theory of gamma-ray burst emission and afterglows.
- High energy gamma-rays and neutrinos from compact objects.
- Origin of ultra-high energy cosmic rays and their propagation.
- Explosive nucleosynthesis in core-collapse supernovae and gamma-ray bursts.
- Particle acceleration mechanism in relativistic shocks.
- Broad research directions in other fields of astrophysics (cosmology, brane-world, etc.).

Research Activities & achievements:

Publications: 109, including: 62 in refereed journals, 4 submitted to refereed journals; 43 in Conference papers.

Invited Talks (International Only):

- "Gamma-Ray Burst Physics", XIV Mexican School on Particles and Fields, Morelia, Mexico, November 4-12 (2010).
- "Ultra-High Energy Cosmic Rays and Neutrinos", XIV Mexican School on Particles and Fields, Morelia, Mexico, November 4-12 (2010).
- "Nonlinear Relativistic Jet Formation and Gamma-Ray bursts", Frontiers of Nonlinear Physics physics IV, Nizhny Novgorod, Russia, July 13-20 (2010).
- "Numerical High-Energy Astrophysics", Workshop on Circumstellar Interactions in Massive Binaries, Hokkaido, Japan March 17-18 (2010).
- "Ultra-High Energy Cosmic Rays and Neutrinos", XIV Mexican School on Particles and Fields, Morelia, Mexico, November 4-12 (2010).
- "Nonlinear Relativistic Jet Formation and Gamma-Ray bursts", Frontiers of Nonlinear Physics physics IV, Nizhny Novgorod, Russia, July 13-20 (2010).
- "Numerical High-Energy Astrophysics", Workshop on Circumstellar Interactions in Massive Binaries, Hokkaido, Japan March 17-18 (2010).
- "Nonlinear Relativistic Jet Formation and Gamma-Ray bursts", Frontiers of Nonlinear Physics physics IV, Nizhny Novgorod, Russia, July 13-20 (2010).
- "Numerical High-Energy Astrophysics", Workshop on Circumstellar Interactions in Massive Binaries, Hokkaido, Japan March 17-18 (2010).

2010 List of Publications

1. D. A. Prokhorov, Y. Dubois, **S. Nagataki**
"An analysis of the temperature structure of galaxy clusters by means of the thermal Sunyaev-Zel'dovich effect" *Astronomy and Astrophysics*, accepted (arXiv:1009.3305)
2. A. Calvez, A. Kusenko, **S. Nagataki**
'The role of Galactic sources and magnetic fields in forming the observed energy-dependent composition of ultrahigh-energy cosmic rays' *Physical Review Letters* 105 (2010) 091101
3. J. Aoi, K. Murase, K. Takahashi, K. Ioka, **S. Nagataki**
'Can we probe the Lorentz factor of gamma-ray bursts from GeV-TeV spectra integrated over internal shocks?' *The Astrophysical Journal*, 722 440-451 (2010).
4. Y. Masada, **S. Nagataki**, K. Shibata, T. Terasawa
'Solar-type Theoretical Model for Magnetar Giant Flare'



Publication of Astronomical Society of Japan, 62 1093-1102 (2010)

5. K. Murase, K. Toma, R. Yamazaki, **S. Nagataki**, K. Ioka

'High-Energy Emission as a Test of the Prior Emission Model for Gamma-Ray Burst Afterglows' Monthly
Nortice of the Royal Astronomical Society 402 L54-L58 (2010).

Papers submitted to refereed journals:

1. **S. Nagataki**

"Rotating BHs as Central Engines of Long GRBs: Faster is Better"

Publications of the Astronomical Society of Japan, submitted.

2. A. Mizuta, **S. Nagataki**, J. Aoi

'Thermal Radiation from GRB Jets' The Astrophysical Journal Letters, submitted (arXiv:1006.2440).

3. X. Cui, J. Aoi, **S. Nagataki**

'Origins of Short Gamma-Ray Bursts Deduced from Offsets to Their Host Galaxies Revisited',

Publication of Astronomical Society of Japan, submitted (arXiv:1004.2302).

Pakhshan Espoukeh

Position: Assistant Professor, Azad University of Tehran, Iran
Period covered: 2015– Present(at ICRANet: 6 March 2017 – 3 April 2017)



I Scientific Work

Mathematical Physics, Quantum Information

II Conferences and educational activities

II a Conferences and Other External Scientific Work

Quantum Information Process Scientific Workshop, Tehran, Iran, 2016.

The International Iran Conference School on *Quantum Information*, Isfahan, Iran, 2014.

21st IPM Physics Spring Conference, Tehran, Iran, 2014.

3rd Conference on Recent Progress in Foundation of Physics, Tehran, Iran, 2013.

III. Service activities

III a. Within ICRANet

III b. Outside ICRANet

Teaching Experience:

- Payam-e-noor University: Classical Mechanics, Quantum Mechanics, Analytical Mechanics, Basic Lab Physics (2006-2012)
- Azad University of Tehran: Classical Mechanics, Electricity and Magnetism, Basic Lab Physics (2015-Present)

2017 List of Publication

Entanglement Degradation in the Presence of the Kerr-Newman Black Hole, M. Asghari, P. Pedram, and P. Espoukeh, to appear in Quant. Inf. Proc.

Park Myeong-Gu

Position: Visiting Scientist

Period covered: 1st Sep. 2016 ~ 31st Aug. 2017



I. Scientific Work

Physics of rotating viscous accretion flow

Exoplanet search around giant stars

II Conferences and educational activities

II a Conferences and Other External Scientific Work

Participate and present a paper at 13th International Conference on Gravitation, Astrophysics, and Cosmology - 15th Italian-Korean Symposium on Relativistic Astrophysics, A Joint Meeting (03 – 07 July 2017, Seoul): Myeong-Gu Park and Du-Hwan Han, Hot Accretion onto Black Holes with Outflow, EPJ Web of Conferences 168: 04005 (2018.01)

II b Work With Students

II c Diploma thesis supervision

II d Other Teaching Duties

II e. Work With Postdocs

III. Service activities

III a. Within ICRANet

III b. Outside ICRANet

Teaching in Kyungpook National University, KOREA: Astrophysics 1, Advanced Astrophysics 1

IV. Other

2016 List of Publication

Byeong-Cheol Lee, Gwanghui Jeong, Myeong-Gu Park, Inwoo Han, David E. Mkrtychian, Artie P. Hatzes, Shenghong Gu, Jinming Bai, Sang-Min Lee, Hyeong-Il Oh, and Kang-Min Kim, Search for Exoplanets around Northern Circumpolar Stars II. The Detection of Radial Velocity Variations in M Giant Stars HD 36384, HD 52030, and HD 208742, Astrophysical Journal 844(1):36 (10pp) (2017.07)

Perez Martinez Aurora Maria

Position: Senior Researcher/Senior Professor
Period covered: 2017



I Scientific Work

- Study of lowly rotation magnetized white dwarfs.
- Study of Neutrino propagation in magnetized media, pulsar kicks.
- Study of neutral vector boson condensation en presence of magnetic field

II Conferences and educational activities 2017

LASNPA & WONP-NURT 2017, 2017-10-23. Work presented: “Anisotropic emission of neutrinos from magnetized quark stars: Pulsar kicks”.

Stars 2017, and SMFNS2017 7-13 May. co-works presented: “On slowly rotating magnetized white dwarfs”; “Neutral vector boson in a constant magnetic field”; “Kicks of magnetized stars induced by anisotropy emission of neutrinos”.

Symposium of Cuban Physical Society 21-28 March 2017. Work presented: “Anisotropy in the emission of neutrinos from Quark stars”.

II b Work With Students.

-Supervision of the master thesis of Diana Alvear Terrero “Rotación de Enanas Blancas magnetizadas” discussed May 19 2017

- Supervision of the master thesis of Lismary Suarez González Phase transition and boson condensate of neutral and charged bosons in presence of magnetic field.

-Supervision of the PhD thesis of Gretel Quintero Angulo. Condensate of neutral and charged bosons in presence of magnetic field. Astrophysical applications: Jets and Boson Stars.

II c Diploma thesis supervision

-Diploma thesis of Physics of Samantha Lopez, Havana University. Havana

II d Other Teaching Duties

Theaching postgraduate course of Topics of Astrophysics. Faculty of Physics Havana University – ICIMAF, 2015-2016.

II e. Work With Postdocs

Work in collaboration with D. Manreza Paret in topics related to:

- Rotating magnetized compact objects.
- Kick of magnetized quark stars

III. Service activities

II a. Within ICRANet

- Discussion of topics of common interest with Kuantay Boshkayev about rotating White Dwarfs

III b. Outside ICRANet

- Collaboration with Gabriella Piccinelli from FES Aragon UNAM, Angel Sanchez from Facultad de Ciencias UNAM, Alejandro Ayala from Instituto de Ciencias Nucleares UNAM and Daryel Manreza Paret from Havana University in the field: neutrino propagation in magnetized dense media and kicks of magnetized quark stars.
- Collaboration with Gabriella Piccinelli from FES Aragon UNAM, Quantum Faraday rotation for weak magnetic field and astrophysical and cosmological applications.
- Collaboration with Daryel Manreza Paret from Havana University. “Rotating White Dwarfs”
- **Seminar** at the Department of Theoretical Physics Fermi National Laboratory FERMILAB, “Impact of the magnetic field in EoS, the structure and velocities of the Quark Stars. Fermilab, Illinois, July 2017”.

IV. Other

Visit Fermi National Laboratory FERMILAB, 1-14 July 2017

Organization of conferences and school:

- Symposium of Cuban Physical Society 2017
- International conferences: stars2017/smfns2017 May 2017

Reviewer of papers of the European Physical Journal A and International Journal of Modern Physics A

List of Publications

- Thermodynamic properties of a neutral vector boson gas in a constant magnetic field G. Quintero Angulo, A. Pérez Martínez, and H. Pérez Rojas
Phys. Rev. C 96, 045810 [\\DOI:https://doi.org/10.1103/PhysRevC.96.045810](https://doi.org/10.1103/PhysRevC.96.045810)
- Effects of magnetic fields and slow rotation in white dwarfs Diana Alvear Terrero, D. Manreza Paret, Aurora María Pérez Martínez.. International Journal of Modern Physics D. Vol. 27, 2018, Pp. 19. <http://dx.doi.org/10.1142/S0218271818500165>
- On rotating white dwarfs within Hartle formalism in general relativity Diana Alvear Terrero, D. Manreza Paret, Aurora María Pérez Martínez. Magnetized and Astronomische Nachrichten. 2017, DOI: <http://onlinelibrary.wiley.com/doi/10.1002/asna.201713435>
- Charged fermion gas polarization in strong magnetic fields D. Manreza Paret, A. Perez Martinez, Alejandro Ayala G. Piccinelli A. Sanchez Astronomische Nachrichten. 2017 DOI: 10.1002/asna.201713449
- Anisotropic equation of state of charged and neutral vector boson gases in a constant magnetic field: Astrophysical implications G. Quintero Angulo, A. Pérez Martínez H. Pérez Rojas Astronomische Nachrichten. 2017 DOI:10.1002/asna.201713448
- Ondas del espacio-tiempo: el nobel de física 2017 D. Manreza Paret A. Pérez Martinez Rev. Cub. Fis. 34, 143 (2017)
- Quantum relativistic electron gas expanding in one dimension. H. Perez Rojas, E. Rodriguez Querts, A. Perez Martinez Int. J. Mod. Phys. Conf. Ser. 45, 1760045 (2017) [9 pages] <https://doi.org/10.1142/S201019451760045X>

Proceedings

- On Slowly Rotating Magnetized White Dwarfs Diana Alvear Terrero, Daryel Manreza Paret, Aurora Pérez Martínez International Journal of Modern Physics: Conference Series Vol. 45 (2017) 1760025 (7 pages) <https://doi.org/10.1142/S2010194517600254>
- Quantum Relativistic Electron Gas Expanding in One Dimension Hugo Pérez Rojas, Elizabeth Rodríguez Querts, Aurora Pérez Martínez Int. J. Mod. Phys. Conf. Ser. 45, 1760045 (2017) [9 pages] <https://doi.org/10.1142/S201019451760045X>
- Quantum Faraday Effect in the Universe Lídice Cruz Rodríguez, Aurora Pérez Martínez, Gabriella Piccinelli, Elizabeth Rodríguez Querts Int. J. Mod. Phys. Conf. Ser. 45, 1760046 (2017) [8 pages] <https://doi.org/10.1142/S2010194517600461>
- Condensation of Neutral Vector Bosons with Magnetic Moment. Gretel Quintero Angulo, Aurora Pérez Martínez, Hugo Pérez Rojas, Int. J. Mod. Phys. Conf. Ser Vol. 45 (2017) 1760047 [9 pages] DOI: 10.1142/S2010194517600473

Piechocki Włodzimierz

Position: Professor

Period covered: 16-22/01/2012

I Scientific Work

Collaboration with Prof. V. Belinski on the cosmological singularity problem.

Talk: 'On the dynamics of the Bianchi IX model near the cosmological singularity',
Pescara, Italy, ICRANet (International Center for Relativistic Astrophysics Network), 2012-01-18

2013 List of Publication

- [1] E. Czuchry and W. Piechocki, 'Bianchi IX model: Reducing phase space',
Phys. Rev. D 87, 084021 (2013) [arXiv:1202.5448 [gr-qc]]

Qadir Asghar

Position: Professor Emeritus

Period covered: 2011 – 2016



I Scientific Work:

1. “Some extensions of the Fermi-Dirac and Bose-Einstein functions with applications to the family of the zeta and related functions” by H.M. Srivastava, M.A. Chaudhry, **A. Qadir** and A. Tassaddiq, Russian J. Math. Phys. **18** (2011) 107 - 121.
2. “Estimating the parameters of the Sgr A* black hole”, F. De Paolis, G. Ingrosso, A. A. Nucita, **A. Qadir** and A. F. Zakharov, Gen. Rel. & Gravit. **43** (2011) 977 – 988.
3. “Primordial black holes in phantom cosmology”, M. Jamil and **A. Qadir**, Gen. Rel. & Gravit. April **43** (2011) 1069 - 1082.
4. “Fourier transform and distributional representation of the generalized gamma function with some applications”, A. Tassaddiq and **A. Qadir**, Applied Mathematics and Computation **218** (2011) 1084 – 1088.
5. “Inequivalence of classes of linearizable systems of cubically semi-linear ordinary differential equations obtained by real and complex symmetry analysis”, S. Ali, **A. Qadir** and M. Safdar, Mathematical and Computational Applications **16** (2011) 923 – 934.
6. “Classification of ordinary differential equations by conditional linearizability and symmetry”, F.M. Mahomed and **A. Qadir**, Communications in Nonlinear Science and Numerical Simulation **17** (2011) 573 - 584.
7. “Possible detection of the M31 rotation in WMAP data”, F. De Paolis, V. G. Gurzadyan, G. Ingrosso, Ph. Jetzer, A. A. Nucita, **A. Qadir**, D. Vetrugno, A. L. Kashin, H. G. Khachatryan, and S. Mirzoyan, Astron. & Astrophys. **534** (2011) L8, 1 – 5.
8. “Fourier transform representation of the extended Fermi-Dirac and Bose-Einstein functions with applications to the family of the zeta and related functions”, A. Tassaddiq and **A. Qadir**, Integral Transforms and Special Functions (2011) DOI 10.1080/10652469.2011.561002.

9. "A new generalization of the Riemann zeta function and its difference equation", M.A. Chaudhry, **A. Qadir** and A. Tassaddiq, *Advances in Differential Equations* **20** (2011) 13 pages.
10. "Linearizability of systems of ordinary differential equations obtained by complex symmetry analysis", by M. Safdar, **A. Qadir** and S. Ali, *Mathematical Problems in Engineering* **10.1155** (2011) 171834, 17 pages.
11. "Laplace-Type Semi-Invariants for a System of Two Linear Hyperbolic Equations by Complex Methods", by F. Mahomed, **A. Qadir** and A. Ramnarian, *Mathematical Problems in Engineering* (**2011**, 202973, 15 pages).
12. "Linearizability criteria for systems of two second-order differential equations by complex methods", S. Ali, F. M. Mahomed and A. Qadir, *Nonlinear Dynamics* **66** (2011) 77 - 88.
13. "Extension of Hardy's class for Ramanujan's interpolation formula and master theorem with applications", M.A. Chaudhry and **A. Qadir**, *J. Ineqs. and Appl.* **52** (2012) pages 1 to 13.
14. "A note on the extended complete and incomplete beta functions", K. Al-Baiyat, M.A. Chaudhry, B. Al-Humaidi and **A. Qadir**, *International Journal of Applied Mathematics* **25** (2012) 51 - 58.
15. "CMB as a possible new tool to study the dark baryons in galaxies", F. De Paolis, G. Ingrosso, A.A. Nucita, D. Vetrugno, V.G. Gurzadyan, A.L. Kashin, H.G. Khachatryan, S. Mirzoyan, Ph. Jetzer and **A. Qadir**, *J. Phys. Conf. Series* **354** (2012) 012004, 8 pages.
16. "Effect of accretion of phantom energy on initial mass of a primordial black hole", S. Naz and **A. Qadir**, *J. Phys. Conf. Series* **354** (2012) 012012, 7 pages.
17. "Self-interaction of gravitational waves and their observability", **A. Qadir**, *J. Phys. Conf. Series* **354** (2012) 012014, 8 pages.
18. "Noether symmetries of the area minimizing Lagrangian", A. Aslam and **A. Qadir**, *Journal of Applied Mathematics* (2012) ID 532690, 14 pages.
19. "Linearization: Geometric, conditional and complex", **A. Qadir**, *Journal of Applied Mathematics* (2012) ID 303960, 30 pages doi:10.1155/2012/303960.
20. "Generating vorticity and magnetic fields in plasmas in general relativity: spacetime curvature drive", F.A. Asenjo, S.M. Mahajan and **A. Qadir**, *Physics of Plasmas* **20** (2013) 22901 (8 pages).
21. "The effects of mass on the radiation of a relativistically rotating neutron star", R.S. Herbst, **A. Qadir**, and E. Momoniat, *New Astronomy* **25** (2013) 38 - 44.

22. "Lie symmetries of the Ricci and energy-momentum tensors", H. Khan, **A. Qadir**, K. Saifullah and M. Ziad, *Eur. Phys. J. Plus* **128** (2013) 144 (7 pages).
23. "Magnetic field seed generation in plasmas by spacetime curvature", **A. Qadir**, F.A. Asenjo and S.M. Mahajan, *Physica Scripta* **89** ([2014](#)) 084002, 7 pages.
24. "Planck confirmation of the M31 disk and halo rotation", F. De Paolis, V.G. Gurzadyan, A.A. Nucita, G. Ingrosso, A.L. Kashin, H.G. Khachatryan, S. Mirzoyan, **A. Qadir** and D. Vertugno, *Astron. and Astrophys.*, **565** (2014) L3 1 - 4.
25. "Reduction of fourth order ordinary differential equations to second and third Lie linearizable forms", H.M. Dutt and **A. Qadir**, *Comm. Nonlin. Sci. and Numerical Simulation*, **19** (2014) 2653 – 2659.
26. "Linearization from Complex Lie Point Transformations", S. Ali, M. Safdar, and **A. Qadir**, *Journal of Applied Mathematics*, **2014** (2014) 793247 (8 pages) doi:10.1155/2014/793247.
27. "Noether symmetries and isometries of the minimal surface Lagrangian under constant volume in a Riemannian space", A. Paliathanasis, **A. Qadir** and M. Tsamparlis, *International Journal of Geometric Methods in Modern Physics* **12** (2015) 1550003 (10 pages).
28. "Higher dimensional systems of differential equations obtainable by iterative use of complex methods", **A. Qadir** and F.M. Mahomed, *Int. J. Mod. Phys. (Conf. Ser.)* **38** (2015) 1560077 (19 pages), eds. S. Ali, F.M. Mahomed and A. Qadir.
29. "Sesquicentennial of the Presentation by James Clerk Maxwell of his paper 'A Dynamical Theory of the Electromagnetic Field' to the Royal Society of London", D.P. Mason and **A. Qadir**, *Int. J. Mod. Phys. (Conf. Ser.)* **38** (2015) 1560070 (23 pages), eds. S. Ali, F.M. Mahomed and A. Qadir.
30. "Fourier transform representation of the generalized hypergeometric functions with applications to the confluent and Gauss hypergeometric functions", M.H. Lail and **A. Qadir**, *Applied Mathematics and Computation* **263** (2015) 392 – 397.
31. "Planck revealed bulk motion of Centaurus A lobes", F. De Paolis, V.G. Gurzadyan, A.A. Nucita¹, G. Ingrosso, A.L. Kashin, H.G. Khachatryan, S. Mirzoyan, G. Yegorian, Ph. Jetzer, **A. Qadir** and D. Vetrugno, *Astronomy & Astrophysics* **580** (2015) L8 DOI: <http://dx.doi.org/10.1051/0004-6361/201526797>).
32. "Fourier transform representation of the generalized hypergeometric functions with applications to the confluent and Gauss hypergeometric functions", M.H. Lail and **A. Qadir**, *Applied Mathematics and Computation* **263** (2015) 392 – 397.

33. “Planck View of M82 Galaxy”, V.G. Gurzadyan, F. De Paolis, A.A. Nucita¹, G. Ingrosso, A.L. Kashin, H.G. Khachatryan, S. Mirzoyan, G. Yegorian, Ph. Jetzer, **A. Qadir** and D. Vetrugno, *Astronomy & Astrophysics* **582** (2015) A77, 4 pages.
34. “Invariant Linearization Criteria for a Three-Dimensional Dynamical System of Second-Order Ordinary Differential Equations and Applications”, A. Aslam, F.M. Mahomed and **A. Qadir**, *International Journal of Non-Linear Mechanics* **78** (2016) 9 - 16.
35. “The Triangulum galaxy seen by Planck”, F. De Paolis, V.G. Gurzadyan, A.A. Nucita, L. Chemin, **A. Qadir**, A.L. Kashin, H.G. Khachatryan, S. Sargsyan, G. Yegorian, G. Ingrosso, Ph. Jetzer, and D. Vetrugno, *Astronomy & Astrophysics* **593** (2016) A57 (7 pages).
36. “Modified relativistic dynamics”, **A. Qadir**, H.W. Lee and K.Y. Kim, *Int. J. Mod. Phys. D* (to appear).
37. “Dark energy via multi-Higgs doublet models: accelerated expansion of the Universe in the two Higgs doublet model scenario”, M. Usman and **A. Qadir**, *Int. J. Mod. Phys. D* (to appear).
38. “Gravitational Waves”, **A. Qadir**, *Journal of GeoSpace Science*, **1** (2015) 1 – 18.
39. “Energy in gravitational waves”, I. Hussain and **A. Qadir**, *Proc. 12th Marcel Grossmann Meeting* 2009, eds. R. Jantzen and R. Ruffini, (World Scientific 2012) pp. 1868 - 1873.
40. “The information loss paradox and the holographic principle”, **A. Qadir**, *Proc. 13th Regional Conference on Mathematical Physics* 2010, (World Scientific 2013) pp. 171 - 181. “The wrapping of magnetic lines of force about a fast rotating neutron star”, **A. Qadir**, R.S. Herbst and E. Momoniat, *Proc. 13th Marcel Grossmann Meeting* 2012, eds. R. Jantzen, K. Rosquist and R. Ruffini, (World Scientific 2015).
41. “Planck confirmation of the M31 disk and halo rotation”, F. De Paolis, D. Vetrugno, A.A. Nucita, G. Ingrosso, V.G. Gurzadyan, P. Jetzer and **A. Qadir**, *Proc. 13th Marcel Grossmann Meeting* 2012, eds. R. Jantzen, K. Rosquist and R. Ruffini, (World Scientific 2015).
42. “Radiative correction for generating magnetic fields in plasmas by spacetime curvature”, **A. Qadir** and R.S. Herbst, *Proc. 14th Marcel Grossmann Meeting* 2012, eds. Massimo Bianchi, R. Jantzen and R. Ruffini, (World Scientific online 2016).
43. “Higgs dark energy in inert doublet model”, M. Usman and **A. Qadir**, *Proceedings of the 14th Regional Conference on Mathematical Physics*, eds. J. Aslam and K. Saifullah, World Scientific (to appear).

II Conferences and educational activities

II a Conferences and Other External Scientific Work conferences and attended 2 more

Participated in Organizing 5 international

II b Work With Students 22 international journal papers and 2 international conference proceedings with MS/M. Phil and PhD students of mine and collaborators.

II c Diploma thesis supervision Apart from research papers included above, supervised 5 PhD theses and 5 MS/M. Phil dissertations; guiding one PhD scholar and 4 MS scholars.

II d Other Teaching Duties 11 courses taught at MS/M. Phil and PhD and 1 at BS level

II e. Work With Postdocs 4 papers with postdocs with collaborators.

III. Service activities

III a. Within ICRANet Only paper at #36 from ICRANet

III b. Outside ICRANet All other activity on my own outside ICRANet

IV. Other

1. “Dr. Asghar Qadir Street”, Jamshaid Town, Karachi, named after me;
2. Third and Fifth Joint Italian Workshops on Relativistic Astrophysics dedicated to me on my 65th and 70th birthdays;
3. One-day Workshop on my 65th birthday held at the Department of Mathematics of Punjab University and for the 70th birthday to be held on 26 November 2016.

2016 List of Publication Given above #s 34 – 37 and 42, 43.

Raffaelli Bernard

Position: Assistant Professor of Physics at ESME
Sudria Lyon (School of Engineering)

Period covered: from September 2015



I Scientific Work

Research interests:

Gravitation, Black Holes Physics, Quantum Field Theory, Quantum Gravity, Cosmology and Foundations of Physics.

My recent works are focused on:

- Gravity/CFT correspondance, CFT2 interpretation of the BTZ black hole Regge Modes,
- Semi-classical strong gravitational lensing,
- Quantum Field Theory on curved spacetime and the role of the quantum vacuum in the accelerated expansion of the Universe, in the framework of Hadamard renormalization,
- Spacetime and Thermodynamics
- Quantum understanding of inertia, matter, spacetime and gravitation, through 2-spinors formalism and the $SL(2,C)$ formulation of General Relativity.

III. Service activities

III b. Outside ICRANet

- Teaching activities at ESME Sudria Lyon: Mechanics, Fluid Mechanics, Thermodynamics, Wave Physics, Electromagnetism, Quantum Physics and Signal Processing.
- Administrative activities: curriculum development, assessment.

IV. Other

Working on: a “simple derivation” of the Mercury perihelion advance for students, gravity/CFT correspondence, Thermodynamics of spacetime.

Riahi Rashid

Position: Visiting-PhD student, Isfahan University of Technology (IUT), Isfahan, Iran

Period covered: 24 Aug 2016- 8 Feb 2017



I Scientific Work

Neutron Stars

II Conferences and educational activities

II a Conferences and Other External Scientific Work

II b Work With Students

II c Diploma thesis supervision

II d Other Teaching Duties

II e. Work With Postdocs

III. Service activities

III a. Within ICRANet

III b. Outside ICRANet

- Lecturer in Islamic Azad University, Shahrekord Branch, Iran

IV. Other

2017 List of Publication

Antonio Enea Romano

Education

University of Wisconsin at Madison, Madison, WI-USA

Ph.D. Physics, May 20 2007

Master in Physics, December 2002

• Positions held

2007/10-2010/2 Postdoctoral fellow, Yukawa Institute, Kyoto, Japan

2010/8-2011/10 Distinguished fellow, National Taiwan University, Taipei

2011/10-now Associate Professor, University of Antioquia

2011-now , Head of Cosmology and Gravitation group, University of Antioquia

• Visiting Positions held

2012/6 -2012/8 Visiting Researcher, ICTP, UNESP, Sao Paolo, Brazil

2012/11-2013/2 Visiting Researcher, YITP, Kyoto University , Kyoto, Japan

2012/7-2013/9 Visiting Researcher, McGill University, Montreal, Canada

2013/12-2014/2 Visiting Researcher, Universidad de Chile, Santiago, Chile

2014/6-2015/6 Research fellow, University of Crete, Heraklion, Greece

2015/6-2015/7 Visiting Researcher, King's College, London, UK

2015/11-2015/12 Visiting Researcher, YITP, Kyoto University , Kyoto, Japan

2016/12-2016/1 Visiting Researcher, National Taiwan University, Taipei, Taiwan

2017/1 , Visiting Professor, ICRA, Pescara

• Awards

Honorable mention for the Gravity Research Foundation essay context, 2011

Japanese Society for the Promotion of Science post-doctoral fellowship 2007

Marie Curie fellowship 2006

University of Wisconsin Scholarship 2001,2002,2004,2005

Della Riccia Fellowship for Italian graduate student in USA, 2000-2002

Jerusalem Winter School of Theoretical Physics, 2002, full support

• Recent Talks and Events

“Non-conservation of adiabatic cosmological perturbations”

Plenary speaker,

November 2016, 1st Colombian Meeting on High Energy Physics

"Adiabaticity and gravity theory independent conservation laws for cosmological perturbations"

21st International Conference on General Relativity and Gravitation (GR21)
New York City , USA, July 10-15, 2016

" H_0 tension and the effects of local structure"

2nd LeCospa International Symposium
Taipei , Taiwan, 14-18/12/2015

"Directional dependence of the local estimation of H_0 and the nonperturbative effects of primordial curvature perturbations"

JGRG 25

Kyoto , Japan, 7-11/7/2015

Queen Mary University of London, Taiwan, 14-18/12/2015

"Non Perturbative Effects Of Primordial Curvature Perturbations On Cosmological Observables"

Marcel Grossmann Meeting - MG14

Rome , Italy, 12-18/7/2015

" H_0 tension and the effects of local structure"

KICC, Cambridge University , UK, 17/6/2015

"Effects of primordial curvature perturbations on the apparent value of the cosmological constant"

Beyond LCDM

Oslo , Norway, 12/2015

Turin University, McGill University 1/2015

"Correction to the apparent value of the cosmological constant due to non perturbative local structures"

20th International Symposium on Particles, Strings and Cosmology, PASCOS 2014

Warsaw, Poland, 7/2014

"Inhomogeneities and fake-dark"

20th International Conference on General Relativity and Gravitation (GR20)"

Warsaw, Poland, 7/2013

Montreal, McGill University 9/2013

"Quantifying the corrections to the apparent value of the cosmological constant due large scale structure"

Gravity and Cosmology 2012 workshop

YITP, Kyoto University, Kyoto, Japan 12/2012;

"Uncertainties on the determination of the equation of state of dark energy"
LeCosPA International Symposium (LeCosPA2012), Taipei, Taiwan, February 6-11
2012 , invited speaker

"Corrections to the apparent value of the cosmological constant due to local
inhomogeneities"

Perimeter Institute, Waterloo Canada 09/2011;
National Taiwan University, Taipei, Taiwan, 09/2011;
KEK, Tsukuba ,Japan 08/2011;

"Effects of inhomogeneities on apparent cosmological observables: 'fake'
evolving dark energy"
Yukawa International Seminar (YKIS2010), "Cosmology -The Next Generation-",
June/July 2011;

"Inhomogeneities, cosmic acceleration and dark energy"
Nineteenth Workshop on General Relativity and Gravitation in Japan (JGRG19),
Tokyo, Japan, 11/2009;

"On the relation between positive averaged acceleration and physical observables in
LTB spaces"
12th Marcel Grossman Meeting, July 2009, Paris,France;

"Effects of particle production during inflation"
Perimeter Institute, Waterloo ,Canada, October 2008;
University of Toronto, Toronto ,Canada, October 2008;

"Inhomogeneities as alternatives to Dark Energy"
LeCosPA Workshop on Dark Energy and Vacuum Structure, December 2008, Taipei,
Taiwan;
KEK Workshop "Are we living in an accelerating Universe?", December 2008,
Tsukuba, Japan;

• Publications in Refereed Journals

- 28) "Global adiabaticity and non-Gaussianity consistency condition"
Antonio Enea Romano, Sander Mooij, Misao Sasaki
Published in Phys.Lett. B761 (2016) 119-124
- 27) "Adiabaticity and gravity theory independent conservation laws for
cosmological perturbations"
Antonio Enea Romano, Sander Mooij, Misao Sasaki
Published in Phys.Lett. B755 (2016) 464-468
- 26) "Effects of local features of the inflaton potential on the spectrum and
bispectrum of primordial perturbations"
Alexander Gallego Cadavid, Antonio Enea Romano
Eur.Phys.J. C76 (2016) no.7, 385
- 25) "Brans-Dicke" with > 0 : Black holes and large scale structures"

Sourav Bhattacharya, Konstantinos F. Dialektopoulos, Antonio E. Romano, Theodore N. Tomaras
 Published in Phys.Rev.Lett. 115 (2015) 18, 181104

24) "Low-redshift effects of local structure on the Hubble parameter in presence of a cosmological constant"
 Antonio Enea Romano, Sergio Andres Vallejo
 Published in Eur.Phys.J. C76 (2016) no.4, 216

23) "Effects of discontinuities of the derivatives of the inflaton potential"
 Antonio Enea Romano, Alexander Gallego Cadavid.
 Published in Eur.Phys.J. C75 (2015) 12, 589

22) "Can the tension in the H_0 estimation be resolved by the non perturbative effects of primordial curvature perturbations?"
 Antonio Enea Romano, Sergio Andrs Vallejo. Mar 9, 2014. 5 pp.
 Published in Europhys.Lett. 109 (2015) 39002

21) "Non-perturbative effects of primordial curvature perturbations on the apparent value of a cosmological constant"
 Antonio Enea Romano, Sergio Sanes, Misao Sasaki, Alexei A. Starobinsky
 Published in Europhys.Lett. 106 (2014) 69002

20) "A new method to determine large scale structure from the luminosity distance" Antonio Enea Romano, Hsu-Wen Chiang, Pisin Chen
 Published in Class.Quant.Grav. 31 (2014) 115008

19) "Low-redshift formula for the luminosity distance in a LTB model with cosmological constant"
 Antonio Enea Romano, Pisin Chen
 Published in Eur.Phys.J. C74 (2014) 2780

18) "Can smooth LTB models mimicking the cosmological constant for the luminosity distance also satisfy the age constraint?"
 Antonio Enea Romano,
 Published in Gen.Rel.Grav., Volume 45, Issue 12, pp 2529-2544

17) "Conditions for low-redshift positive apparent acceleration in smooth inhomogeneous models",
 Antonio Enea Romano,
 Published in Gen.Rel.Grav., DOI: 10.1007/s10714-013-1541-x

16) "Inhomogeneous cosmological models and H_0 observations",
 Antonio Enea Romano,
 Published in International Journal of Modern Physics D Vol. 21, No. 12

15) "Effects of inhomogeneities on apparent cosmological observables: 'fake' evolving dark energy",
 Antonio Enea Romano, Misao Sasaki, Alexei A. Starobinsky,
 Published in Eur. Phys. J. C (2012) 72:2242

- 14) "Apparent versus true value of the cosmological constant", Selected for Honorable Mention in the Gravity Research Foundation 2011 Essay Competition, Antonio Enea Romano, Pisin Chen, Published in Int.J.Mod.Phys. D20 (2011) 2823-2830
- 13) "Large and strong scale dependent bispectrum in single field inflation from a sharp feature in the mass", Frederico Arroja, Antonio Enea Romano, Misao Sasaki, Published in Phys.Rev. D84 (2011) 123503
- 12) "Spatial averaging and apparent acceleration in inhomogeneous spaces" Antonio Enea Romano, Misao Sasaki, Published in Gen.Rel.Grav. 44 (2012) 353-365
- 11) "Corrections to the apparent value of the cosmological constant due to local inhomogeneities" Antonio Enea Romano, Pisin Chen, Published in JCAP10(2011)016
- 10) "Mimicking the cosmological constant for the luminosity distance and galaxy number counts with large scale inhomogeneities.", Antonio Enea Romano, Phys.Rev.D82:123528,2010.
- 9) "Can the cosmological constant be mimicked by smooth large-scale inhomogeneities for more than one observable?", Antonio Enea Romano, Published in JCAP 1005:020,2010.
- 8) "Testing homogeneity with galaxy number counts : light-cone metric and general lowredshift expansion for a central observer in a matter dominated isotropic universe without cosmological constant", Antonio Enea Romano, Published in JCAP01(2010)004
- 7) "The statistics of voids as a tool to constrain cosmological parameters: σ_8 and $\Omega_m h$ ", Juan Betancort-Rijo, Santiago G. Patiri, Francisco Prada, Antonio Enea Romano Published in Mon. Not. of the Royal Astron. Society, Volume 400, Issue 4,1835-1849
- 6) "Effects of particle production during inflation", Antonio Enea Romano, Misao Sasaki, Published in Phys.Rev.D78:103522, 2008
- 5) "Redshift spherical shell energy in isotropic Universes ", Antonio Enea Romano Published in Phys.Rev.D76:103525,2007
- 4) "LTB universes as alternatives to dark energy: does positive averaged acceleration imply positive cosmic acceleration", Antonio Enea Romano, Published in Phys.Rev.D75:043509, 2007

- 3) "Mapping Luminosity-Redshift Relationship to LTB Cosmology",
Daniel Chung, Antonio Enea Romano,
Published in Phys.Rev.D74:103507, 2006
- 2) "Approximate Consistency Condition from Running Spectral Index in Slow-Roll Inflationary Models",
Daniel Chung, Antonio Enea Romano,
Published in Phys.Rev.D73:103510, 2006
- 1) "Godel-type space-time metrics",
Antonio Enea Romano, Charles Goebel,
Published in Gen.Rel.Grav.35:1857-1863

Romero Gustavo E.

Position: Chief Researcher (CONICET),

Full Professor (University of La Plata, Argentina).

Period covered: 2012



I. Scientific Work

Research on black holes, magnetized plasma, AGNs, microquasars, foundations of general relativity.

II Conferences and educational activities

II a Conferences and Other External Scientific Work

(just 2012):

Relativistic particles in magnetized media around black holes

G.E. Romero, F.L. Vieyro.

Expositor: G.E. Romero

13th Marcel Grossmann Meeting.

Stockholm, Sweeden, July, 2012.

Accretion disks around Kerr black holes in modi_ed gravity

D. Perez, G.E. Romero.

Expositor: D. Perez.

13th Marcel Grossmann Meeting.

Stockholm, Sweeden, July, 2012.

Non-thermal radiation from bowshocks of massive runaway stars G.E. Romero, M.V. del Valle.

Expositor: G.E. Romero

GAMMA2012, 5th International Heidelberg Symposium on High-Energy Gamma-Ray Astronomy.
Heidelberg, Germany, July, 2012.

Radiation from black hole accretion in $f(R)$ gravity D. P_erez, G.E. Romero.

Expositor: D. Perez

GAMMA2012, 5th International Heidelberg Symposium on High-Energy Gamma-Ray Astronomy.
Heidelberg, Germany, July, 2012.

Episodic gamma-ray emission from the low-mass X-ray binary GRO J0422+32 F.L. Vieyro,
G.E. Romero, J.M. Paredes, Y. Sestayo.

Expositor: F.L. Vieyro

GAMMA2012, 5th International Heidelberg Symposium on High-Energy Gamma-Ray Astronomy.
Heidelberg, Germany, July, 2012.

Gamma-ray emission from massive stars interacting with AGN jets A.T. Araudo, V. Bosch-
Ramon, G.E. Romero.

Expositor: F.L. Vieyro

GAMMA2012, 5th International Heidelberg Symposium on High-Energy Gamma-Ray Astronomy.
Heidelberg, Germany, July, 2012.

High-Energy Emission from Young and Massive Stellar Objects

G.E. Romero

Exploring the Non-Thermal Universe with Gamma Rays. On the occasion of Felix Aharonian
60th birthday.

Universitat de Barcelona, Barcelona, Spain, November 6th - November 9th, 2012.

I. Conferences and educational activities

II a Work With Students

PhD Supervision (La Plata University): 3 students.

II b Other Teaching Duties

Courses on "Introduction to Black Hole Astrophysics" and "introduction to Relativistic Astrophysics", both UNLP (2012)

II c. Work With Postdocs

Two posdocs (CONICET).

III. Service activities

Outside ICRANet

CTA SAPO Member

Advise Committee CONICET

Vice-Director (IAR-CONICET)

Member Directive Council, Department of Astronomy and Geophysics, University of La Plata.

IV. Other

Visiting Scientist ICRA-Pescara, July 2012.

Soroush Shakeri



Position: **PhD Visitor**

Period covered: **1 year-Since 2016-February**

I Scientific Work

Strong Field QED Phenomena (In Astrophysics and Ground Based Laser Experiments), Pulsar Physics (Polarization Characteristics), Early Universe Cosmology (Cosmological phase transitions), Non-Perturbative QCD based on Effective field theoretical model , Gamma Ray Bursts (Data analysis and their phenomenological aspects).

II Conferences and educational activities

II a Conferences and Other External Scientific Work

Summer school on particle physics , 15-26 Jun 2015, ICTP Trieste, Italy

The 21st international symposium on particles, strings and cosmology, 29 June to 3 July 2015, Trieste, Italy

- Fourteenth Marcel Grossmann Meeting - MGXIV of Rome (12-18 July, 2015), Rome, Italy

II b Work With Students

II c Diploma thesis supervision

II d Other Teaching Duties

II e. Work With Postdocs

III. Service activities

III a. Within ICRANet

Lecture : “Afterglow: from synchrotron emission to polarization characteristics “ Fourth Bego Rencontres -IRAP Ph.D. Erasmus Mundus school, May 30th - June 3^d, 2016, Villa Ratti, Nice-Soroush Shakeri.

Lecture : “Nonlinear QED effects : From GRBs to High power lasers“ Supernovae, Hypernovae and Binary Driven Hypernovae An Adriatic Workshop Pescara - June 20-30, 2016-Soroush Shakeri.

”Generation of Circularly Polarized Radio Wave from Pulsars via photon-photon interaction”
M.Haghighat, S.Shakeri, presented as poster in Fourteenth Marcel Grossmann Meeting -
MGXIV of Rome (12-18 July, 2015), Rome, Ital

III b. Outside ICRANet

Teaching Experiences :

Undergraduate Courses: Quantum Mechanic(I), Basic Lab Physics, Payame Noor University of Ahvaz-IRAN-
2012-2014

Teacher Subjects at Isfahan University of Technology(IUT)-Isfahan-IRAN: Foundations of
Electromagnetic theory and Basic Lab Physics as undergraduate course, 2015-2016

IV. Other

2016 List of Publication

“On the universal late X-ray emission of binary-driven hypernovae and its possible
collimation” G.B. Pisani, R. Ruffini, Y. Aimuratov, C.L. Bianco, M. Kovacevic, R. Moradi, M. Muccino, A.V.
Penacchioni, J.A. Rueda, **S. Shakeri** Y. Wang. ***APJ, 2016 [arXiv:1610.05619]***

”Analysis the phase diagram of QCD and predicting a little period of inflation in the QCD
phase transition in the early Universe”, S.Shakeri, Hamid Reza Sepangi, Proceeding of the Spring
Conference of Institute for Research in Fundamental Sciences(IPM), Tehran, Iran, Spring 2012.

”Quark Confinement And Chiral Symmetry Breaking In The Early Universe”, S.Shakeri, Hamid
Reza Sepangi, Proceeding of Annual Physics of Iran, Physics Society of Iran(PSI), Azad University, Tehran, Iran,
January 2014.

“Polarization of a probe laser beam due to the nonlinear QED effects” ,S. Shakeri, et al, submitted
to PRA.2016

Polarization changes of X-ray emission from Pulsars due to the nonlinear QED effects , S.
Shakeri, in preparation. 2016

Sergio Torres



Position: Researcher
Centro Internacional de Física, Bogotá, Colombia

Period covered: 2016

I Scientific Work

Leading a research group studying cosmological models and analysis of cosmic background radiation data;

Principal investigator (1995) of the Galactic Emission Mapping (GEM) project in Colombia, consisting of an international collaboration to survey the galactic radiation in the 408 – 5000 MHz range.

II Conferences and educational activities

II a Conferences and Other External Scientific Work

II b Work With Students

Cosmology Workshop, Universidad Nacional de Colombia, Bogotá, Colombia

II c Diploma thesis supervision

II d Other Teaching Duties

II e. Work With Postdocs

III. Service activities

III a. Within ICRANet

III b. Outside ICRANet

Dynamical Astronomy in Latin America - ADeLA, Universidad de los Andes, Bogotá, September 28-30, 2016

IV. Other

2016 List of Publication

S. Torres, O. Restrepo, J. C. Cuervo, G. Chaparro, Analysis of Anisotropy in the Hubble Flow, TECCIENCIA, 2016

Chaparro Molano G., Restrepo Gaitan O. A., Cuervo J. C., and Torres S., "Bayesian Estimation of Uncertainties for Redshift Independent Distance Measurements in the NED-D Catalog", *Dynamical Astronomy in Latin America - ADeLA*, Universidad de los Andes, Bogotá, September 28-30, 2016

Tizchang Seddigheh

Position: PhD Student

Present institute: Dep. Of Physics, Isfahan University
Of Technology, Isfahan, Iran

Period covered: 2012 -present



I Scientific Work:

I am working on: phenomenology of SM bosons in NonCommutative space- time.

In ICRANet I worked on: Circular polarization and opacity of high energy photon such as GRB in presence of background cosmic ray.

II Conferences and educational activities

II a Conferences and Other External Scientific Work outside ICRANet

A few national conferences held in Iran.

III. Service activities

IIIa. Inside ICRANet

Collaboration with ICRANet as visitor, November 2014- May 2015, Pescara, Italy.

III b. Outside ICRANet

Instructing a few Physics Courses in one of the universities in Iran .

IV. Other

We presented our work in MG14 as two posters.

- I. Interaction of High Energy photons with the background radiation in the universe.
- II. The generation of circular polarization of Gamma Ray Bursts.

(2015) List of Publication

- S. Batebi, M. Haghighat, S. Tizchang, H. Akafzadeh, *Higgs Couplings in NonCommutative Standard Model*, Int. J. Mod. Phys. A **30**, 1550108 (2015).
- Interaction of High Energy photons with the background radiation in the universe (in progress).
- The generation of circular polarization of Gamma Ray Bursts (in progress).

Van Putten Maurice



Position: Associate Professor of Astronomy

Period covered: 2013-present

I Scientific Work. Multimessenger gravitational-wave physics and astronomy focused on long duration bursts from black hole spindown in hyper-energetic core-collapse supernovae and gamma-ray bursts; priors to gravitational wave searches with KAGRA (Japan) and LIGO-Virgo (US-EU) from analysis of GRB light curves from BATSE, BeppoSax and Swift; Gravitational attraction from Gibbs' principle; Tidal streams from evaporation of globular clusters; Hyperbolic formulations of general relativity and relativistic magneto-hydrodynamics with applications to numerical simulations (first-ever on the morphological evolution of relativistic hydro- and MHD jets in 1993 and 1996); Experimental fluid dynamics in modulated Rayleigh-Benard chambers (approved for use in commerce by CTEP/CDFA #5554-08, 6 US and EU patents).

II Conferences and educational activities

II a Conferences and Other External Scientific Work

2012: Invited talk at GRB4/MG13, Stockholm, Sweden

2013: May 23, Colloquium, Department of Astronomy, Yonsei University, Seoul Korea

2013: June 4, Talk at Starobinsky fest, June 3-5, IEU, Ewha Woman University, Seoul

II b Work With Students

Searches for progenitors to long GRBs in X-ray afterglow data

II c Other Teaching Duties

2012-present: Relativistic Astrophysics I/II, Mathematical Astronomy I/II, Introduction to Relativity and Gravitation.

III. Service activities

2009-present: Member of the USNWG/NIST on H2

2013 List of Publication

van Putten, M.H.P.M., 2013, Search for gravitational waves in supernovae and long GRBs, in Proc. Vulcano Workshop Frontier Objects in Astrop. Phys., May 28-June 2, Vulcano, Italy, Acta Polytechnica, to appear
Book: Lectures in Astrophysics, in preparation

International Relativistic Astrophysics Ph. D.

ARGÜELLES CARLOS RAÚL

Position:

Assistant Professor of Theoretical Physics

Faculty of Exact Sciences, La Plata National University

Researcher, Theoretical Physics Area

National Research Council of Science & Technology
(CONICET)

Faculty of Astronomical and Geophysical Sciences

Paseo del Bosque s/n, B1900FWA La Plata, Buenos Aires

Tel: 005402214236593-109

charly@carina.fcaglp.unlp.edu.ar



Period covered: 2016 -

I Scientific Work

Research in theoretical and phenomenological aspects of particle Dark Matter, Galactic dynamics, Cosmology, Physics beyond standard model, General Relativity, Modified gravity, compact objects, Black Hole Physics.

II Conferences and educational activities

II a Conferences and Other External Scientific Work

Public conference on National TV in the topic: 'porque se expande el Universo?', TV pública, Argentina, December 6, 2017

Assistance to the 5th International Workshop for the design of the ANDES underground Laboratory, Buenos Aires, Argentina, June 29-30, 2017

Assistance to School on Dark matter at ICTP-SAIFR/IFT-UNESP, Sao Paulo, Brazil, June-July 2016

Invited talk at Supernovae, Hypernovae and Binary driven Hypernovae – An adriatic Workshop, Pescara, Italy, June 20 –30 2016

Invited talk at the Gravitational Waves, Cosmology and Compact Objects workshop, La Plata, Argentina, March 8 –9 2016

II b Work With Students

Master in Science Thesis supervisor.

- i) Graduate Student: Manuel Díaz - University of Buenos Aires (UBA). Issue: Dark Matter and structure formation

- ii) Graduate Student: Rafael Yunis – University of Buenos Aires (UBA). Issue: Dark matter Indirect detection

II c Diploma thesis supervision

Ph.D. advisor

Ph.D. Student: Andreas Krut. Thesis: Dark matter and galactic structures. Institution: ICRANet-Erasmus Mundus Joint Doctorate (fifth cycle) Period covered: (2014-). Director: Prof. Dr. R. Ruffini

II d Other Teaching Duties

Assistant Professor position in Quantum field theory at La Plata National University (Exact Sciences Faculty)

II e. Work With Postdocs

III. Service activities [*activities carried out in collaboration with ICRANet (e.g. teaching activities, conferences etc...) and outside ICRANet (teaching activities in your university etc...)*]

III a. Within ICRANet

Scientific collaborator; Ph.D co-advisor; Meeting conferences.

III b. Outside ICRANet

Researcher position at CONICET – Argentina. Working place: FCAGLP - UNLP, La Plata, Argentina. Paseo del Bosque, Casco Urbano, B1900FWA La Plata, Buenos Aires. Phone: +54 0221 4236593 Int. 1052. Teaching activities as Assistant Professor at UNLP.

IV. Other

2017 List of Publication

- [1] C. R. Argüelles, A. Krut, J. A. Rueda, and R. Ruffini, 'Novel constraints on fermionic dark matter from galactic observables', MNRAS, submitted (2017), arXiv:1606.07040[v2]
- [2] N. E. Mavromatos, C. R. Argüelles, R. Ruffini, and J. A. Rueda, 'Self-interacting dark matter', IJMPD, Volume 26, Issue 3, id. 1730007 (2017), doi: 10.1142/S0218271817300075

Baghmanyany Vardan

Position: IRAP Ph.D. student
Period covered: 2016 - present



I Scientific Work

Novice research skills in high energy astrophysics, astrophysical data analysis and time series analysis.

II Conferences and educational activities

II a Conferences and Other External Scientific Work

- 1-st ICRANet Scientific Meeting in Armenia: Black Holes and the largest energy sources in the Universe (2014).
- The 6th International Symposium on High-Energy Gamma-Ray Astronomy (Gamma 2016), Heidelberg, Germany.
- High-Energy Phenomena in Relativistic Outflows VI (HEPRO 6), Moscow, Russia (2017).

2017 List of Publication

- D. Zargaryan, S. Gasparyan, V. Baghmanyany and N. Sahakyan, Comparing 3C 120 jet emission at small and large scales, *Astronomy & Astrophysics*.
- V. Baghmanyany, S. Gasparyan and N. Sahakyan, Rapid Gamma-Ray Variability of NGC 1275, *The Astrophysical Journal*.

Barbarino Cristina

Position: PhD Students
Period covered: 2012-2015



I Scientific Work

Research activities in Supernovae: observations, photometric and spectroscopic data reduction and data analysis, in both optical and near-infrared bands, of a wide range of SNe types from hydrogen-rich to he-poor.

The aim of this work is the study of different types of core-collapse supernovae. The study of photometric and spectroscopic evolutions of single objects is important to highlight the main characteristics of the target. A comparison with the literature is also necessary to identify common or peculiar behaviours.

II Conferences and educational activities

II a Conferences and Other External Scientific Work

- MG14: “Fourteenth Marcel Grossman Meeting”, 12 July 2015 → 18 July 2015, Roma (Italy)
- EWASS2015: “European Week of Astronomy and Space Science”, 22 June 2015 → 26 June 2015, La Laguna (Tenerife)
- “PESSTO meeting” organized by Prof M. Dennefeld and Prof. S.J. Smartt, 15 June 2015 → 17 June 2015, Paris (France)
- “Opticon observing school and Awareness conference” organized by Prof M. Dennefeld, 17 September 2014 → 1th October 2014, Rozhen & Sofia (Bulgaria)
- 1st Scientific ICRANet Meeting in Armenia “Black Holes: the largest energy sources in the Universe”, June 30 → 4 July 2014, Yerevan (Armenia)
- “PESSTO meeting” organized by Prof. S.J. Smartt, 19 June 2014 → 21 June 2014, Belfast (UK)
- IRAP PhD and ERASMUS MUNDUS Workshop on “Supernovae, Gamma-ray bursts and the induced gravitational collapse” organized by Prof. R. Ruffini and Prof. P. Chardonay, 11 May 2014 → 16 May 2014, Les Houches (France)

- IRAP PhD and ERASMUS MUNDUS School “*Nice winter school*” organized by Prof. R. Ruffini and Prof. P. Chardonay, 23 February 2014 – 2 March 2014, Nice (France)

- “*PESSTO meeting*” organized by Prof. M. Della Valle and Prof. S.J. Smartt, 6 October 2013 → 8 October 2013, Napoli (Italy)

- 10 nights of observations at the ESO NTT Telescope in La Silla as third astronomer, 21 July 2013 → 22 August 2013, La Silla (Cile)

- “*The first URCA meeting on Relativistic Astrophysics*” organized by Prof. R. Ruffini, 24 June 2013 → 29 June 2013, Rio de Janeiro (Brasil)

- “*The 2013 yearly ICRANet Scientific Meeting on Relativistic Astrophysics*” held by Prof. R. Ruffini, 3 June 2013 → 21 June 2013, Pescara (Italy)

- Seminars on “*Second Bego Scientific Rencontre Meeting*” organized by Prof. R. Ruffini, 16 May 2013 → 31 May 2013, Nice (France)

- “*PESSTO meeting*” organized by Prof. M. Turatto and Prof. S.J. Smartt, 28 April 2013 → 30 April 2013, Padova (Italy)

II c Diploma thesis supervision

Supervisor: Massimo Della Valle

Thesis: “*The fickle death of massive stars: from Hydrogen-rich to He-poor Supernova explosions*”

III. Service activities [*activities carried out in collaboration with ICRANet (e.g. teaching activities, conferences etc...) and outside ICRANet (teaching activities in your university etc...)*]

III a. Within ICRANet

- Talk on “*The first URCA meeting on Relativistic Astrophysics*” organized by Prof. R. Ruffini, 24 June 2013 → 29 June 2013, Rio de Janeiro (Brasil): “*On the supernovae shock-breakout*”

- Talk on “*Second Bego Scientific Rencontre Meeting*” organized by Prof. R. Ruffini, 16 May 2013 → 31 May 2013, Nice (France): “*The photometric and spectroscopic evolution of type IIP SN 2012e?*”

III b. Outside ICRANet

- Talk on “*PESSTO meeting*” organized by Prof M. Dennefeld and Prof. S.J. Smartt, 15 June 2015 → 17 June 2015, Paris (France): “*Preliminary results on SN LSQ14efl*”

- Talk on “*PESSTO meeting*” organized by Prof. S.J. Smartt, 19 June 2014 → 21 June 2014, Belfast (UK): “*The photometric and spectroscopic evolution of type IIP SN 2012e?*”

- Talk on “*PESSTO meeting*” organized by Prof. M. Della Valle and Prof. S.J. Smartt, 6 October 2013 → 8 October 2013, Napoli (Italy): “*Preliminary results of type IIP SN 2012e?*”

- Talk on “PESSTO meeting” organized by Prof. M. Turatto and Prof. S.J. Smartt, 28 April 2013 → 30 April 2013, Padova (Italy): “*Preliminary results of type IIP SN 2012ec*”

2013-2015 List of Publication

1) “*SN 2012ec: mass of the progenitor from PESSTO follow-up of the photospheric phase*”

Barbarino, C., Dall'Ora, M., Botticella, M.T., et al. 2015, MNRAS, 448, 2312

2) “*Supersolar Ni/Fe production in the Type IIP SN 2012ec*”

Jerkstrand, A., Smartt, S.~J., Sollerman, J., et al. 2015, MNRAS, 448, 2482

3) “*PESSTO: survey description and products from the first data release by the Public ESO Spectroscopic Survey of Transient Objects*”

Smartt, S.~J., Valenti, S., Fraser, M., et al. 2015, A&A, 579, A40

4) “*A search for Fermi bursts associated with supernovae and their frequency of occurrence*”

Kovacevic, M., Izzo, L., Wang, Y., et al. 2014, A&A, 569, A108

5) “*Induced gravitational collapse at extreme cosmological distances: the case of GRB 090423*”

Ruffini, R., Izzo, L., Muccino, M., et al. 2014, A&A, 569, A39

6) “*Supernova 2012ec: identification of the progenitor and early monitoring with PESSTO*”

Maund, J.~R., Fraser, M., Smartt, S.~J., et al. 2013, MNRAS, 431, L102

CURRICULUM VITAE ET STUDIORUM

Marco Valerio Battisti
ICRA – Physics Department University of Rome ``La Sapienza"
battisti@icra.it

Personal data:

Date of birth: August 31 1981, Rome, Italy.
Citizenship: Italian.
Home address: via A. Fusco 85, 00136 Rome.
Telephone: ++39 06 49693228/49914397.

Education:

- November 2005 Beginning of the PhD (IRAP PhD), Supervisor: Dr. G.Montani
Department of Physics, University of Rome ``La Sapienza".
- September 2005 Master Degree in Physics, grade: 110/110 cum laude (full marks and honors)
Department of Physics, University of Rome ``La Sapienza".

Master Thesis's Advisors: Dr. G.Montani and Prof. R.Ruffini.
Title of Thesis: ``*Dark matter candidate from an evolutionary quantum
cosmology for a generic inhomogeneous model*'".

Courses followed during the PhD:

- Mathematical Problems in General Relativity*, by Prof. D.Christodoulou, ETH Zurich, January 2006.
- Geometrodynamics and matter fields*, by Dr. G.Montani, University of Rome "La Sapienza", Spring 2006.
- Gauge Theory*, by Prof. L.Maiani, University of Rome "La Sapienza", Spring 2006.
- Quantum Field Theory*, by Prof. M.Testa, University of Rome "La Sapienza", Autumn 2006.
- Introduction to Quantum Gravity*, by Dr. G.Amelino-Camelia, University of Rome "La Sapienza", Autumn 2006.

Meetings, workshop and PhD school:

- September 2007 **The 2nd Stueckelberg Workshop**, (main lectures by Prof. T.Thiemann)
Pescara, 3-8 September.
- July 2007 **4th Italian-Sino Workshop on Relativistic Astrophysics**, Pescara, 20-30 July.
- March 2007 **Noncommutative Spacetime Geometries**, (main lectures by Prof. J.Wess,

Prof. S.Doplicher and Prof. A.Chamseddine) Alessandria, 25-31 March.

- December 2006 **Gravitational Waves, Relativistic Astrophysics and Cosmology**, (main lectures by Prof. A.Starobinski, Prof. G.Gibbons and Prof. S.Deser) Paris, 28 November- 15 December.
- September 2006 **XII Brazilian School of Cosmology and Gravitation**, (main lectures by Prof. V.Mukhanov, Prof. M.Bojowald and Prof. V.Belinski) Rio de Janeiro, 10-23 September.
- July 2006 **Eleventh Marcel Grossmann Meeting on General Relativity**, Berlin, 23-29 July.
- June 2006 **The 1st Stueckelberg Workshop**, (main lectures by Prof. A.Ashtekar) Pescara, 26-30 June.
- June 2006 **Planck scale in Astrophysics and Cosmology**, (organized by Dr. G.Amelino-Camelia and Dr. A.Melchiorri) Rome, 19-20 June.
- February 2006 **1st Bego rencontre**, (main lectures by Prof. T.Damour) Nice, 6-16 February.
- June 2005 **The Russian-Italian Lifshitz-Zeldovich Meeting on Relativistic Astrophysics**, Pescara, 27 June- 3 July.
- June 2005 **2nd Italian-Sino Workshop on Relativistic Astrophysics**, Pescara, 11-20 June.

Given talks and seminars:

- September 2007 ``The 2nd Stueckelberg Workshop'', (main lectures by Prof. T.Thiemann) Pescara, 3-8 September.
 Title of talks:
 1) *Quantum cosmology in a generalized uncertainty principle framework*
 2) *Cosmological implications of an evolutionary quantum gravity*
- July 2007 ``4th Italian-Sino Workshop on Relativistic Astrophysics'', Pescara, 20-30 July.
 Title of talk:
 Minisuperspace dynamics in a generalized uncertainty principle framework
- June 2007 ``ICRA seminars on Quantum Gravity'', Rome.
 Title of seminar:
 Mixmaster dynamics from the Loop Quantum Cosmology point of view
- July 2006 ``Eleventh Marcel Grossmann Meeting on General Relativity'', Berlin, 23-29 July.
 Title of talk: *Generic evolutionary quantum universe*
- June 2006 ``The 1st Stueckelberg meeting'', (main lectures by Prof. A.Ashtekar) Pescara, 26-30 June.

Title of talk: *Generic evolutionary quantum cosmology*

-June 2006 ``Planck scale in Astrophysics and Cosmology'', (organized by Dr. G.Amelino-Camelia and Dr. A.Melchiorri) Rome, 19-20 June.

Title of talk: *Is minisuperspace arena for GUP approach?*

-May 2006 ``ICRA seminars on Quantum Gravity'', Rome.

Title of seminar: *The framework of Loop Quantum Cosmology*

-April 2006 ``ICRA seminars on Quantum Gravity'', Rome.

Title of seminar:

Generalized uncertainty principle and noncommutative spacetime

Publications list:

[1] G.Montani, M.V.Battisti, R.Benini, G.Imponente, *Classical and quantum features of the Mixmaster singularity*, Int.J.Mod.Phys.A (2007) in press, invited review paper, [arXiv:0712.3008].

[2] M.V.Battisti, G.Montani, *Minisuperspace dynamics in a generalized uncertainty principle framework*, proceedings of the 4th Italian-Sino Workshop on Relativistic Astrophysics, AIP Conf. Proc. 966 (2007) 219-226, [arXiv:0709.4610].

[3] M.V.Battisti, G.Montani, *Quantum dynamics of the Taub Universe in a generalized uncertainty principle framework*, Phys.Rev.D (2007) in press, [arXiv:0707.2726].

[4] M.V.Battisti, G.Montani, *The big-bang singularity in the framework of a generalized uncertainty principle*, Phys.Lett.B 656 (2007) 96-101, [gr-qc/0703025].

[5] M.V.Battisti, G.Montani, *Evolutionary quantization of cosmological models*, proceedings of the 1st Stueckelberg Workshop, Nuovo Cim.B 122 (2007) 179-184, [gr-qc/0701095].

[6] M.V.Battisti, G.Montani, *Generic evolutionary quantum Universe*, proceedings of the XI Marcel Grossmann Meeting on General Relativity, [gr-qc/0610084].

[7] M.V.Battisti, G.Montani, *Evolutionary Quantum Dynamics of a Generic Universe*, Phys.Lett.B 637 (2006) 203-209, [gr-qc/0604049].

Research activities:

The research activity of Marco Valerio Battisti, in collaboration with Giovanni Montani, is focused mainly on three directions:

- I) The cosmological implications of an evolutionary quantum gravity.
- II) The quantization of cosmological model in the framework of the generalized uncertainty principle.
- III) The analysis of the semi-classical limit of the quantum Universe.

I) The evolutionary approach is based on a conceptual criticism on the consistency of the (classical)

3+1 splitting of the spacetime manifold, performed in the canonical approaches to quantum gravity. The underlying idea is that only with the introduction of a dust into the dynamics a physical slicing can be performed. This way, a notion of time is naturally restored and the WDW equation is replaced by a Schrodinger one.

To analyze the phenomenological implications of such an approach, the generic inhomogeneous model, i.e. the only one which can really describe the quantum Universe, is analyzed and the corresponding eigenvalue problem solved. In particular, the quantum dynamics is performed with respect to Planck-mass particles, which can be regarded as a perfect gas in the Planck era. On the other hand, a nonrelativistic matter component into the early Universe is induced by them. The actual Universe phenomenology is investigated imposing by hand a Planckian cut-off length in the theory and the spectrum appears to be limited by below at the Planck scale. This way, it was shown that the contribution to the actual critical parameter of this dust fluid is negligible and thus no phenomenology can come out from such a matter field. From this point of view, an evolutionary quantum cosmology overlaps the Wheeler-DeWitt approach and therefore, such a scheme, can be inferred as appropriate to describe early stages of the Universe without significant traces on the later evolution.

II) The quantization of cosmological models by using a deformed Heisenberg algebra leads to the implementation of a minimal scale in the minisuperspace dynamics. Such a minimal length is nothing but the non-vanishing uncertainty in the configuration variables coming out from the generalized uncertainty principle (GUP), which is reproduced by the modified algebra. Our work is based on the analysis on the fate of the cosmological singularity, in FRW and in Taub model, in such a framework. In the FRW model the evolution of the system is performed with respect to a massless scalar field and the dynamics of wave packets from a quasi-classical region to the initial singularity is analyzed. In the WDW approach the wave packets follow the classical trajectories up to the singularity differently from the behavior in the GUP scheme in which they "escape" from such trajectories. As matter of fact, the probability density to find the Universe near the classic time where the singularity appears goes to zero and the GUP quantum Universe approaches stationary states "near the Planckian region". In this respect, the classical cosmological singularity appears to be probabilistically suppressed in the model. The analysis of the Taub model (a particular case of Bianchi IX) leads qualitatively to the same results. The probability density to find the Universe is peaked "near" the potential wall and the wave packets exhibit a stationary behavior. In other words, the model avoids the singularity since the presence of a deformation parameter in the GUP localizes the wave function away from it. Moreover, the value of anisotropy for which the probability amplitude is peaked corresponds to a quasi-isotropic Universe.

III) The intuition of Vilenkin about an (only possible) approximative interpretation of the Universe wave function is enlarged in order to analyze the quasi-classical limit of the Universe. In particular, the idea that the isotropic volume of the Universe has, in some sense, a privileged role in this process is developed. This way, the anisotropy variables which describe the physical degrees of freedom of the system, are the "real" quantum fields and become classical by the Universe expansion. In this respect, this analysis could also provide a concrete step towards the explanation of the role of the gravitational constant in the isotropization process. However, this is only a work in progress and therefore without precise results.

Tutoring experiences:

-2007: Assigned as tutor to the undergraduate student Riccardo Belvedere for his degree thesis at University of Rome "La Sapienza": *"On the semiclassical limit of a quantum Universe"*

Computer skills:

Operative systems: Windows.
Typesetting: Latex, WinWord, PowerPoint.
Data analysis: Excel.
Computational task: Mathematica, Maple.

Languages:

Italian: Native language.
English: Fluent.

Professional membership:

Member of the “Societa` Italiana di Fisica” (SIF)

Member of the “International Center for Relativistic Astrophysics” (ICRA)

Sports and hobbies:

Climbing, music (in particular percussions) and traveling.

Rome, December 2007

Becerra Bayona Laura Marcela

Position: PhD student

Period covered: 2014-present



I Scientific Work

During my Ph.D I have worked on the Induced Gravitational Collapse (IGC) paradigm in which a carbon-oxygen core explodes in a Type Ib/c supernovae in presence of a close neutron star companion. The supernovae triggers an hypercritical accretion into the neutron star and depending of the initial binary parameters the system can have different fates. In a first scenario, also referred as binary-driven hypernova (BdHNe), the binary is enough bound, so the accretion rate to NS allows to it reaches its critical mass, and collapse to a black hole with a GRB emission. A second scenario can happen for binary systems with larger binary separations, then the hypercritical accretion onto the NS is not sufficient to induced its gravitational collapse. Instead of a GRB emission, a X-ray flash (XRF) is produced. I have worked on the hypercritical accretion process, following the evolution of the NS, in order to characterized the observational signatures in each scenario.

I have also worked on the evolution of postmergers remnants of white dwarfs binary systems. The simulations of coalescence between white dwarfs have shown that the final result consists of a central remnant made of the undisturbed primary star. The secondary star is totally disrupted and about half of the material is accreted by the primary, forming a hot corona surrounding it, and the rest of the material forms a rapidly rotating Keplerian disk, since little mass is ejected from the system during the coalescence process. I have modelled the evolution of this last system, exploring the different initial conditions that allows to the white dwarfs collapse to a neutron star or explode as a Type Ia supernovae.

II Conferences and educational activities

II a Conferences and Other External Scientific Work

- *IRAP Ph.D. Erasmus Mundus Workshop*, Supernovae, Gamma-ray bursts and the induced gravitational collapse, May 11th–16th, 2014 Les Houches (France). Asistant.
- *1stScientificICRANet Meeting in Armenia: Black Holes: the largest energysources in the Universe*, June 30th –July 4th, 2014. Yerevan, Armenia.Asistant
- *Third BegoRencontres. IRAP Ph.D. Erasmus Mundus school*. September 8th-19th, 2014 . “Hypercritical Accretion in Binary-Driven Hypernova”. L. Becerra, J. Rueda and R. Ruffini
- *Conference Swift 10 Years of Discovery. Rome, Italy*.Decembre 1st-5th, 2014. “Hypercritical Accretion, Induced Gravitational Collapse, and Binary-Driven Hypernova”. L. Becerra, et. al.

- The Second ICRANet César Lattes Meeting. Rio de Janeiro, Brasil. April 13rd-18th, 2015. “Angular Momentum Transfer During the Hypercritical Accretion in Binary-Driven-Hypernova” L. Becerra, F. Cippolletta, F. Fryer, J. Rueda and R. Ruffini.
- Fourteenth Marcel Grossmann Meeting – MG14. Rome, Italy. July 12nd-18th, 2015:
 1. “Angular Momentum Transfer Role in the Hypercritical Accretion of Binary-Driven-Hypernova” L. Becerra, F. Cippolletta, F. Fryer, J. Rueda and R. Ruffini.
 2. “Induced compression by angular momentum loss in fast rotating, magnetized Super-Chandrasekhar white dwarfs” L. Becerra, E. Garcia-Berro, P. Loren-Aguilar and J. Rueda
- Supernovae, Hypernovae and Binary Driven Hypernovae. An Adriatic Workshop. Pescara, Italy. July 20-30, 2016:
 1. “The spin evolution of fast rotating, magnetized super-Chandrasekhar white dwarfs in the aftermath of white dwarfs mergers” L. Becerra, E. Garcia-Berro, P. Loren-Aguilar and J. Rueda.
 2. “On the induced gravitational collapse scenario of gamma-ray bursts associated with supernova”. L. Becerra, C. L. Biando, C. Fryer, J. A. Rueda, R. Ruffini.
- XV Latin American Regional IAU Meeting (LARIM). Cartagena, Colombia. October 3-7/2016. “Hypercritical Accretion in the Induced Gravitational Collapse” L. Becerra, C. L. Biando, C. Fryer, J. A. Rueda, R. Ruffini.
- The 2017 Annual meeting of the Division of Gravitation and Relativistic Astrophysics of the Chinese Physical Society - Fifth Galileo-Xu Guangqai Meeting. Chengdu, China. June 25-30, 2017. “SPH simulations of the induced gravitational collapse scenario”. L. Becerra, C. L. Bianco, F. Fryer, J. A. Rueda and R. Ruffini
- International Conference on Gravitation: Joint Conference of ICGAC-XIII and IK15. Seoul, Korea. July 3-7, 2017. “On the induced gravitational collapse”. L. Becerra, C. L. Bianco, F. Fryer, J. A. Rueda and R. Ruffini.
- THESEUS (Transient High Energy Sky and Early Universe Surveyor) Workshop, Naples, Italy. October 5-6, 2017. “On the induced gravitational collapse scenario”. L. Becerra, C. L. Bianco, F. Fryer, J. A. Rueda and R. Ruffini.

2017 List of Publication

- R. Ruffini, Y. Wang, Y. Aimuratov, U. Barres de Almeida, L. Becerra, C. L. Bianco, Y. C. Chen, M. Karlica, M. Kovacevic, J. D. Melon Fuksman, R. Moradi, M. Muccino, A. V. Penacchioni, G. B. Pisani, D. Primorac, J. A. Rueda, G. V. Vereshchagin, and S. S. Xue. Early X-ray Flares in GRBs. , Accepted in ApJ (2017).
- J. A. Rueda, Y. Aimuratov, U. B. de Almeida, L. Becerra, C. L. Bianco, C. Cherubini, S. Filippi, M. Karlica, M. Kovacevic, J. D. M. Fuksman, R. Moradi, M. Muccino, A. V. Penacchioni, G. B. Pisani, D. Primorac, R. Ruffini, N. Sahakyan, S. Shakeri, Y. Wang. The binary systems associated with short and long gamma-ray bursts and their detectability. IJMPD 26 (2017)

- J. D. Uribe, L. Becerra, M. M. Guzzo, F. Rossi-Torres, J. A. Rueda and R. Ruffini. Neutrino oscillations within the induced gravitational collapse paradigm of long gamma-ray bursts. Accepted in ApJ (2017)
- L. Becerra, F. Cipolletta, C. Fryer, J. A. Rueda, and R. Ruffini. On the Induced Gravitational Collapse. Joint International Conference of ICGAC-XIII and IK-15 on Gravitation, Astrophysics and Cosmology. EPJ Web of Conferences, Volume 168. <https://doi.org/10.1051/epjconf/201816802005>. EwhaWomans University, Seoul, Korea (2017)
- L. Becerra, C. Ellinger, C.L. Fryer, J. A. Rueda and R. Ruffini. SPH simulation of the Induced Gravitational Collapse. In preparation (2017)

Bedić Suzana

Position: IRAP PhD Student, ICRANet,
University of Rome la Sapienza

Period covered: November 2016 onwards



I Scientific Work

- Hopf-algebra approach to quantum gravity
- geometric operators in noncommutative spacetimes, spinning spacetime
- relative locality
- quantum field theory on noncommutative spacetimes, k-Minkowski spacetime
- Loop Quantum Cosmology, phase space probability measure
- PhD supervisor: Giovanni Amelino-Camelia, Sapienza University of Rome

II Conferences and educational activities

The Sixth Physics and Philosophy Meeting in Conjunction with the summer school, 4-7 July, 2017, Split, Croatia

Belvedere Riccardo

Position: Post Doc

Period covered: April 2014 - Present



I Scientific Work

I am collaborating with Professor Remo Ruffini and Dr. Rueda to analyze the astrophysical consequences of our new model of neutron stars, in particular focusing on its effect on the Kerr quadrupole moment and the creation of a black hole. At the same time I am working with Professor Sergio Barbosa Duarte, from CBPF, to introduce more degrees of freedom in our neutron stars model, taking into account the Delta-Resonances in the Walecka and Zimanyi-Moszkowski models. With Professor Rodrigo Picanço Negreiros, from UFF (Universidade Federal Fluminense), I am applying the cooling to our model of neutron stars, being it, until now, developed in the $T=0$ limit.

II Conferences and educational activities

- The Second ICRANet César Lattes Meeting, Niteroi – Rio de Janeiro, Brazil, April, 13-18, 2015
- Fourteenth Marcel Grossmann Meeting – MG14 – University of Rome “La Sapienza” - Rome, July, 12-18, 2015.

2015 List of Publication

- R. Belvedere, J. A. Rueda, and R. Ruffini,
“On the Magnetic Field of Pulsars with Realistic Neutron Star Configurations”.
Astrophys. J., 799, 23, (2015)
- R. Belvedere, J. A. Rueda, and R. Ruffini,
“Suitability of Analytical Formulas for the Determination of the Neutron Star Keplerian Frequency and Moment of Inertia”.
Submitted to *Phys. Rev. C*

Benetti Micol

Position: Post- doctoral in the National
Observatory of Rio de Janeiro
Period covered: 15/8/2014 - now



I Scientific Work

In the past year I started to work in the National Observatory of Rio de Janeiro. I was principally interested in implement the galaxy data (e.g the SDSS - data release 11) in the Cosmomc code, in order to use them in cosmology analyses. I also continue my Phd topic on constraining inflationary models, starting collaborations with the Prof. Rudnei Ramos (UERJ - Universidade do Estado do Rio de Janeiro) and the Prof. Susana Landau (IFIBA-Instituto de Física de Buenos Aires). I was also involved in two collaboration. First, with G. C. Carvalho, on the Baryon Acoustic Oscillations analysis; we submitted the work in PRD journal. Then, with C. Novaes, on primordial Non-Gaussianities signal; we submitted the work in JCAP journal. Finally, I participated at several conference, presenting our results.

II Conferences and educational activities

II a Conferences and Other External Scientific Work

Presented talk in XIVth Marcel Grossmann Meeting - International meeting, July 12-18 2015, Rome, Italy
Presented talk in Meeting on Fundamental Cosmology - International meeting, June 17-19 2015, Santander, Spain
Presented talk in VIth Workshop Challenges Of New Physics In Space - International meeting, May 24-29 2015, Campos do Jordao, SP, Brazil
Presented talk in 2nd Cesar Lattes Meeting - International ICRAnet meeting, Apr 13-18 2015, Rio de Janeiro, RJ, Brazil
Presented talk in 10th J-PAS Collaboration Meeting - International J-PAS meeting, Feb 9-13 2015, Paraty, RJ, Brazil
Participating in School of Theory of cosmological perturbations - Ph.D School, Nov 12-14 2014, Rio de Janeiro, RJ, Brazil
Participating in XIXth Cycle of Special Courses (CCE) - Ph.D School, Nov 3-7 2014, Rio de Janeiro, RJ, Brazil
Presented talk in Theory Miniworkshop J-PAS collaboration - National J-PAS meeting, Oct 15 2014, Rio de Janeiro, RJ, Brazil
Participating in Ist School of Statistical Methods in Physics - Ph.D School, Oct 6-10 2014, Goiania, GO, Brazil

II b Work With Students

II c Diploma thesis supervision

II d Other Teaching Duties

Lesson for graduates in the cycle courses “Escola de inverno 2015”. Location: Observatorio Nacional.
Topic: The Early Universe.

Mini course for PhD and Post-PhD. Location: Observatorio Nacional. Topic: The CAMB code.

II e. Work With Postdocs

III. Service activities [*activities carried out in collaboration with ICRANet (e.g. teaching activities, conferences etc...) and outside ICRANet (teaching activities in your university etc...)*]

III a. Within ICRANet

Presented talk in XIVth Marcel Grossmann Meeting - International meeting, July 12-18 2015, Rome, Italy

Presented talk in 2nd Cesar Lattes Meeting - International ICRANet meeting, Apr 13-18 2015, Rio de Janeiro, RJ, Brazil

III b. Outside ICRANet

Lesson for graduates in the cycle courses “Escola de inverno 2015”. Location: Observatorio Nacional.
Topic: The Early Universe.

Mini course for PhD and Post-PhD. Location: Observatorio Nacional. Topic: The CAMB code.

IV. Other

Affiliations:

J-PAS collaboration, Javalambre-Physics of the Accelerated Universe Astrophysical Survey.

SDSS IV collaboration, Sloan Digital Sky Survey.

2014 List of Publication

“Primordial Non-Gaussianities of inflationary step like models” Camila P. Novaes, M. Benetti, A. Bernui (arXiv:1507.01657. Submitted in JCAP - Journal of Cosmology and Astroparticle Physics)

”Baryon Acoustic Oscillations from the SDSS DR10 galaxies angular correlation function” G. C. Carvalho, A. Bernui, M. Benetti, J. C. Carvalho, J. S. Alcaniz (arXiv:1507.08972. Submitted in Phys. Rev. D)

Boshkayev Kuantay

Position: Associate Professor

Period covered: July 9- August 25, 2017



I Scientific Work

General Relativity, Relativistic Astrophysics and Compact objects

II Conferences and educational activities

1 Boshkayev K. I-Love-Q relations in White Dwarf Stars. Integration of Belarusian scientists in the research programs of the world's leading nuclear physics centers ICRANet-Minsk Workshop April 26-28, 2017, Minsk, Belarus.

2 Boshkayev K. Main parameters of neutron stars from QPOs in LMXBs. Seminar in Institute of Theoretical Physics, Faculty of Mathematics and Physics, Charles University, Prague, July 7, 2017

III. Service activities

III a. Within ICRANet

Collaboration with prof. Remo Ruffini, Dr. Jorge Rueda and Dr. Marco Muccino.

III b. Outside ICRANet

Delivering lectures in Theoretical Physics, Faculty of Physics and Technology of Kazakh National University, Almaty, Kazakhstan.

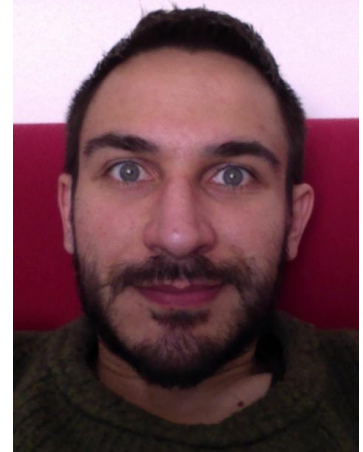
2017 List of Publication

1. Takibayev N., Boshkayev K. Neutron Stars, Physics, Properties and Dynamics. New-York «Nova Science Publishers, Inc», 2017.- 288 pages. ISBN 9781536105070

2. Boshkayev K., Quevedo H., Zhami B. I -Love- Q relations for white dwarf stars // Monthly Notices of the Royal Astronomical Society, Volume 464, Issue 4, p.4349-4359 (2017).

3. Muccino M., Boshkayev K. Physical insight into the Combo-relation // Monthly Notices of the Royal Astronomical Society.- Vol. 468. – P. 570-576 (2017).
4. Abishev, M.E., Boshkayev, K.A., Ivashchuk, V.D. Dilatonic dyon-like black hole solutions in the model with two Abelian gauge fields // European Physical Journal C, Vol. 77, p. 180 (2017).
5. Boshkayev K, Rueda J.A., Muccino M. Main parameters of neutron stars from quasi-periodic oscillations in low mass X-ray binaries // Proceedings of the 14th Marcel Grossmann Meeting. – 2017. – P. 3433-3440.
6. Boshkayev K, Rueda J.A., Ruffini R., Zhami B. Induced compression of white dwarfs by angular momentum loss // Proceedings of the 14th Marcel Grossmann Meeting. – 2017. – P. 4379-4384.
7. Boshkayev K, Rueda J.A., Ruffini R., Zhami B., Kalymova Zh., Balgimbekov G. Mass-radius relations of white dwarfs at finite temperatures // Proceedings of the 14th Marcel Grossmann Meeting. – 2017. – P. 4287-4290.

Bravetti Alessandro



Position: PhD-Postdoc

Period covered: 2009-2014

I Scientific Work

We've worked out new results in the geometric formulation of thermodynamic fluctuation theory, with special focus on the Sasakian structure of the phase space of thermodynamics, on connections with the AdS/CFT correspondence, and on applications in the investigation of the thermodynamic instabilities of black holes and cosmological models. Besides, we have been also working on a project on the phenomenological analysis of different cosmological models by means of the so-called 'cosmography' of the universe.

II Conferences and educational activities

II a Conferences and Other External Scientific Work

- 2nd Workshop on Gravitation, High Energy Physics and Cosmology. August 4-6, 2014, Cuernavaca, Mexico.
- 10th School of Gravitation and Mathematical Physics Division of the Mexican Physical Society. December 1-5, 2014, Playa del Carmen, Mexico.

II e. Work With Postdocs

Work with former ICRANet student and now postdoc at the University of Naples, Dr. Orlando Luongo on the phenomenological investigation of cosmological models.

III. Service activities

III a. Within ICRANet

I defended my doctoral thesis at the University of Rome 'La Sapienza' on January 16th 2014.

III b. Outside ICRANet

Participation in the organization of the weekly seminar of the group led by Prof. Hernando Quevedo at the National Autonomous University of Mexico City.

2014 List of Publication

Peer-Reviewed Publications

- “Thermodynamic curvature and ensemble nonequivalence” A. Bravetti & F. Nettel, Phys. Rev. D 90, 044064, (2014).
 - “Precision cosmology with Padé rational approximations: Theoretical predictions versus observational limits” A. Aviles, A. Bravetti, S. Capozziello & O. Luongo, Phys. Rev. D 90, 043531, (2014).
 - “Representation invariant geometrothermodynamics: Applications to ordinary thermodynamic systems” A. Bravetti, C. S. L. Monsalvo, F. Nettel & H. Quevedo, J. Geom. Phys. 81, 1-9, (2014).
 - “Dark energy from geometrothermodynamics” A. Bravetti & O. Luongo, Int. J. Geom. Methods Mod. Phys. 11, 1450071, (2014).

Submitted Publications

- “Sasakian geometry in thermodynamic fluctuation theory” A. Bravetti & C. S. L. Monsalvo, arXiv:1408.5443 [math-ph].
- “Contact symmetries and Hamiltonian thermodynamics” A. Bravetti, C. S. L. Monsalvo & F. Nettel, arXiv:1409.7340 [math-ph].

Cáceres Uribe, Diego Leonardo

Position: PhD.

Period covered: 2012 - 2017



I Scientific Work

Soft gamma ray repeaters (SGRs) and anomalous X-ray pulsars (AXPs) are compact objects that can be explained as massive fast rotating white dwarfs. The stability properties of white dwarfs can account for the observed periods (2-12 secs) of these objects and their rotational energy loss can explain the high luminosities in x and gamma ray bands. I am focused on the magnetospheric emission of these objects, in order to explain the emission in X and gamma rays, taking into account the backflow of positrons coming from the magnetosphere and from the interaction between gamma-ray curvature photons and the intense magnetic fields ($B \sim 10^8 - 10^9$ G).

I also worked on the stability of magnetized white dwarfs, in particular, the microscopic instabilities coming from the Inverse-beta decay, the Pycnonuclear reactions and General Relativity.

II Conferences and educational activities

II a Conferences and Other External Scientific Work

Assistance to meetings organized by Icara such as:

1. 13th Marcel Grossman Meeting, July 1-7, 2012. Stockholm, Sweden.
2. IRAP PhD. Erasmus Mundus School. September 3 – 21, 2012. Nice, Frances.
3. 1st Scientific ICRANet Meeting in Armenia, June 30 – July 4, 2014. Yerevan, Armenia.
4. 14th Marcel Grossman Meeting, July 12-18, 2015. Rome, Italy

Participation with oral presentation in the following events:

- “On the stability of highly magnetized white dwarfs”. Diego Leonardo Cáceres Uribe, Jorge Armando Rueda Hernández and Remo Ruffini. 2nd Bego Rencontres, Université Nice Sophia Antipolis. 16-31 May 2013, Nice, France.

- “High Magnetic Fields in White Dwarfs”. Diego Leonardo Cáceres Uribe, Jorge Armando Rueda Hernández and Remo Ruffini. The 13th Italian-Korean Symposium on Relativistic Astrophysics. 15-19 July 2013, Seoul-Korea, 2013.
- “Magnetospheric emission of soft gamma-ray repeaters (SGRs) and anomalous x-ray pulsars (AXPs) within the white dwarf model”. The 27th Texas symposium on relativistic astrophysics. 8 – 13 December, 2013, Texas, United States of America.
- “Soft Gamma-Ray Repeater and Anomalous X-Ray Pulsars as Highly Magnetized Massive Highly Rotating White Dwarfs”. Diego Leonardo Cáceres Uribe, Jorge Armando Rueda Hernández and Remo Ruffini. 3rd Bego Rencontres, Université Nice Sophia Antipolis. 8 – 19 September 2014, Nice, France.
- “On the Spin-Down of Anomalous X-Ray Pulsars and Soft Gamma-Ray Repeater as Pulsar White Dwarfs”.
- Diego Leonardo Cáceres Uribe, Jorge Armando Rueda Hernández and Remo Ruffini. 4th Marcel Grossman Meeting, July 12-18, 2015. Rome, Italy.

2017 List of Publications

1. “Dynamical instability of white dwarfs and breaking of spherical symmetry under the presence of extreme magnetic fields”. J. G. Coelho, R. M. Marinho Jr., M. Malheiro, R. Negreiros, D. L. Cáceres, J. A. Rueda and R. Ruffini [arXiv: 1306.4658v2]. The Astrophysical Journal, Volume 794, Issue 1, 86 (2014).
2. “On the stability of ultra-magnetized white dwarfs”. Diego L. Cáceres, Jorge A. Rueda and Remo Ruffini. Journal of the Korean Physical Society. Volume 65, Issue 6, pp. 846-849.
3. “The rotation-powered nature of some soft gamma-ray repeaters and anomalous X-ray Pulsars”. Jaziel Coelho, Diego L. Cáceres, Rafael C. R. de Lima, Manuel Malheiro, Jorge A. Rueda and Remo Ruffini. Astronomy and Astrophysics, Volume 599 (March 2017), article Number A87, 10 pages. Published online 03 March 2017.
4. “Thermal X-ray emission from massive, fast rotating, highly magnetized white dwarfs”. Diego L. Cáceres, Sheyse M. de Carvalho, Jaziel G. Coelho, Rafael C. R. de Lima, Jorge A. Rueda. Monthly Notices of the Royal Astronomical Society, Volume 465, Issue 4, 11 March 2017. Pages 4434-4440. Published online 23 November 2016.

Curriculum Vitae et Studiorum

Dr. Letizia Caito

Dipartimento di Fisica
Università di Roma "La Sapienza"
P.le Aldo Moro 5
00185 Roma, Italy.
Telephone: +39 06 4991 4397
E-mail: letizia.caito@icra.it

PERSONAL DATA

Date of birth: June 14, 1981

Place of birth: Roma , Italy.

Citizenship: Italian.

Home address: via Colle S. Pietro 26, 03100 Frosinone (FR), Italy.

Home telephone: +39 0775 854531.

Mobile telephone: +39 347 0686438.

EDUCATION

November 2007 *Physics Department University of Rome "La Sapienza", Rome, Italy.*

November 2006 *Physics Department, University of Rome "La Sapienza", Rome, Italy.*
Admitted to the **International Relativistic Astrophysics Ph.D. Program (IRAP PhD)** granted with a fellowship by the six participating institutions: ETH Zurich, Freie Universität Berlin, Observatoire de la Côte d'Azur, Université de Nice - Sophia Antipolis, Università di Roma "La Sapienza", Université de Savoie (<http://www.icra.it/IRAPPhD/>.)

May 2006 *Physics Department University of Rome "La Sapienza", Rome, Italy.*
Master Degree in Physics, grade: 110/110 cum laude.
Thesis advisors: Prof. R. Ruffini, Dr. C.L. Bianco.
"Theoretical interpretation of GRB011121".

July 2000 *Scientific High School "F. Severi", Frosinone (FR), Italy.*
Scientific High School Diploma, grade: 100/100.

COMPUTER SKILLS

Operating Systems: Windows (very good).

Data Analysis: Gnuplot (good), Excel (good).

Typesetting and Presentations: LaTeX(very good), OpenOffice.org (very good).

LANGUAGES

Italian: Native language.

English: Fluent.

French: Good.

RESEARCH INTERESTS

- High Energy Astrophysics: Gamma-Ray Bursts.
- Cosmology.

RESEARCH EXPERIENCES

2006 – 2007 *Physics Department, University “La Sapienza”, Rome, Italy.*
Supervisor: Prof. R.Ruffini.

Theoretical analysis of the properties of both the prompt and the late afterglow phase of Gamma Ray Burst (GRB) GRB060614. This burst is an example for GRBs characterized by an initial spikelike emission followed by a soft bump like e.g. GRB970228, GRB050724, identifying in this way a possible new class of GRBs whose peculiarities depend on their astrophysical setting.

2002 - 2003 *Physics Department, University “La Sapienza”, Rome, Italy.*
Supervisors: Prof. R.Ruffini and Dr. C.L.Bianco.

Theoretical analysis of both the prompt and the late afterglow emission of GRB011121, obtaining confirmations about the predictions of the model used. In particular, it has been possible to reproduce for the first time one flare, typical feature of the afterglow phase, confirming the interpretation given by the theories assumed.

PUBLICATIONS IN REFEREED JOURNALS

1. Maria Grazia Bernardini, Carlo Luciano Bianco, Letizia Caito, Maria Giovanna Dainotti, Roberto Guida, Remo Ruffini, "GRB970228 and a class of GRBs with an initial spikelike emission", **A&A Lett.** **474 (2007) 13-17.**
2. Maria Giovanna Dainotti, Maria Grazia Bernardini, Carlo Luciano Bianco, Letizia Caito, Roberto Guida, Remo Ruffini, "GRB060218 and GRBs associated with Supernovae Ib/c", **A&A Lett.** **471 (2007) 29-32.**
3. Maria Grazia Bernardini, Carlo Luciano Bianco, Letizia Caito, Pascal Chardonnet, Alessandra Corsi, Maria Giovanna Dainotti, Federico Fraschetti, Roberto Guida, Remo Ruffini, She-Sheng Xue, "GRB970228 as a prototype for Short GRBs with Afterglow", in the Proceedings of "Swift and GRBs: Unveiling the Relativistic Universe" in Venezia, Italy, June 5-9, 2006, **Il Nuovo Cimento B** **121 (2006) 1439-1440.**
4. Remo Ruffini, Maria Grazia Bernardini, Carlo Luciano Bianco, Letizia Caito, Pascal Chardonnet, Maria Giovanna Dainotti, Federico Fraschetti, Roberto Guida, She-Sheng Xue, "GRB 050315: a step toward the uniqueness of the overall GRB structure and the true nature of long GRBs", in the Proceedings of "Swift and GRBs: Unveiling the Relativistic Universe" in Venezia, Italy, June 5-9, 2006, **Il Nuovo Cimento B** **121 (2006) 1367-1372.**

CONFERENCE PROCEEDINGS

1. Letizia Caito, Maria Grazia Bernardini, Carlo Luciano Bianco, Maria Giovanna Dainotti, Roberto Guida, Remo Ruffini, "GRB060614: a progress report", to appear in the Proceedings of the "4th Italian-Sino Workshop on Relativistic Astrophysics" in Pescara, Italy, July 20-30, 2007, ed. C.L. Bianco, S.S.Xue, **AIP Conf. Proc.**, in press.
2. Carlo Luciano Bianco, Maria Grazia Bernardini, Letizia Caito, Maria Giovanna Dainotti, Roberto Guida, Remo Ruffini, "The fireshell model and the canonical GRB scenario", to appear in the Proceedings of the "4th Italian-Sino Workshop on Relativistic Astrophysics" in Pescara, Italy, July 20-30, 2007, ed. C.L. Bianco, S.S.Xue, **AIP Conf. Proc.**, in press.
3. Maria Grazia Bernardini, Carlo Luciano Bianco, Letizia Caito, Maria Giovanna Dainotti, Roberto Guida, Remo Ruffini, "GRB970228 and the class of GRBs with an initial spikelike emission: do they fulfill the Amati relation?", to appear in the Proceedings of the "4th Italian-Sino Workshop on Relativistic Astrophysics", in Pescara, Italy, July 20-30, 2007, ed. C.L. Bianco, S.S.Xue, **AIP Conf. Proc.**, in press.
4. Maria Giovanna Dainotti, Maria Grazia Bernardini, Carlo Luciano Bianco, Letizia Caito, Roberto Guida, Remo Ruffini, "On GRB 060218 and binaries as progenitors of GRB-SN"

- systems*”, to appear in the Proceedings of the “4th Italian-Sino Workshop on Relativistic Astrophysics” in Pescara, Italy, July 20-30, 2007, ed. C.L. Bianco, S.S.Xue, **AIP Conf. Proc.**, in press.
5. Roberto Guida, Maria Grazia Bernardini, Carlo Luciano Bianco, Letizia Caito, Maria Giovanna Dainotti, Remo Ruffini, “*The Amati relation within the fireshell model*”, to appear in the Proceedings of the “4th Italian-Sino Workshop on Relativistic Astrophysics” in Pescara, Italy, July 20-30, 2007, ed. C.L. Bianco, S.S.Xue, **AIP Conf. Proc.**, in press.
 6. Letizia Caito, Maria Grazia Bernardini, Carlo Luciano Bianco, Maria Giovanna Dainotti, Roberto Guida, Remo Ruffini, “*Theoretical interpretation of GRB011121*”, to appear in the Proceedings of the “XI Marcel Grossmann Meeting”, in Berlin, Germany, July 23-29, 2006, ed. H. Kleinert, R. Jantzen and R.Ruffini, **World Scientific**, in press.
 7. Maria Grazia Bernardini, Carlo Luciano Bianco, Letizia Caito, Maria Giovanna Dainotti, Roberto Guida, Remo Ruffini, “*GRB970228 as a prototype for the class of GRBs with an initial spikelike emission*”, to appear in the Proceedings of the “XI Marcel Grossmann Meeting”, in Berlin, Germany, July 23-29, 2006, ed. H. Kleinert, R. Jantzen and R.Ruffini, **World Scientific**, in press.
 8. Maria Grazia Bernardini, Carlo Luciano Bianco, Letizia Caito, Maria Giovanna Dainotti, Roberto Guida, Remo Ruffini, “*GRB980425 and the puzzling URCA1 emission*”, to appear in the Proceedings of the “XI Marcel Grossmann Meeting”, in Berlin, Germany, July 23-29, 2006, ed. H. Kleinert, R. Jantzen and R.Ruffini, **World Scientific**, in press.
 9. Carlo Luciano Bianco, Maria Grazia Bernardini, Letizia Caito, Maria Giovanna Dainotti, Roberto Guida, Remo Ruffini, “*The fireshell model and the Swift Era*”, to appear in the Proceedings of the “XI Marcel Grossmann Meeting”, in Berlin, Germany, July 23-29, 2006, ed. H. Kleinert, R. Jantzen and R.Ruffini, **World Scientific**, in press.
 10. Carlo Luciano Bianco, Maria Grazia Bernardini, Letizia Caito, Maria Giovanna Dainotti, Roberto Guida, Remo Ruffini, “*Theoretical interpretation of short and long GRBs*”, to appear in the Proceedings of the “XI Marcel Grossmann Meeting”, in Berlin, Germany, July 23-29, 2006, ed. H. Kleinert, R. Jantzen and R.Ruffini, **World Scientific**, in press.
 11. Carlo Luciano Bianco, Maria Grazia Bernardini, Letizia Caito, Maria Giovanna Dainotti, Roberto Guida, Remo Ruffini, “*Theoretical interpretation of luminosity and spectral properties of GRB 031203*”, to appear in the Proceedings of the “XI Marcel Grossmann Meeting”, in Berlin, Germany, July 23-29, 2006, ed. H. Kleinert, R. Jantzen and R.Ruffini, **World Scientific**, in press.
 12. Maria Giovanna Dainotti, Maria Grazia Bernardini, Carlo Luciano Bianco, Letizia Caito, Roberto Guida, Remo Ruffini, “*On GRB 060218 and the GRBs related to Supernovae Ib/c*”, to appear in the Proceedings of the “XI Marcel Grossmann Meeting”, in Berlin, Germany,

July 23-29, 2006, ed. H. Kleinert, R. Jantzen and R. Ruffini, **World Scientific**, in press.

13. Roberto Guida, Maria Grazia Bernardini, Carlo Luciano Bianco, Letizia Caito, Maria Giovanna Dainotti, Remo Ruffini, "Theoretical interpretation of GRB060124", to appear in the Proceedings of the "*XI Marcel Grossmann Meeting*", in Berlin, Germany, July 23-29, 2006, ed. H. Kleinert, R. Jantzen and R. Ruffini, **World Scientific**, in press.
14. Remo Ruffini, Maria Grazia Bernardini, Carlo Luciano Bianco, Letizia Caito, Maria Giovanna Dainotti, Roberto Guida, "Gamma Ray Bursts", to appear in the Proceedings of the "*XI Marcel Grossmann Meeting*", in Berlin, Germany, July 23-29, 2006, ed. H. Kleinert, R. Jantzen and R. Ruffini, **World Scientific**, in press.
15. Remo Ruffini, Maria Grazia Bernardini, Carlo Luciano Bianco, Letizia Caito, Pascal Chardonnet, Maria Giovanna Dainotti, Federico Fraschetti, Roberto Guida, Gregory Vereshchagin, She-Sheng Xue, "The role of GRB031203 in clarifying the astrophysical GRB scenario", to appear in the Proceedings of the "*6th INTEGRAL Workshop – The obscured universe*" in Moscow, Russia, July 2-8, 2006, ed. S. Grebenev, R. Sunyaev and C. Winkler, **ESA Special Publication**, in press.
16. Remo Ruffini, Maria Grazia Bernardini, Carlo Luciano Bianco, Letizia Caito, Pascal Chardonnet, Maria Giovanna Dainotti, Federico Fraschetti, Roberto Guida, Michael Rotondo, Gregory Vereshchagin, Luca Vitagliano, She-Sheng Xue, "The Blackholic energy and the canonical Gamma-Ray Burst", in the Proceeding of the "*XII Brazilian School of Cosmology and Gravitation*" in Rio de Janeiro, Brazil, September 10-23, 2006, ed. M. Novello and S. Perez-Bergliaffa, **AIP Conf.Proc. 910 (2007)**

MEETINGS AND WORKSHOPS

July 2007: “4th Italian-Sino Workshop on Relativistic Astrophysics”, Pescara (Italy), July 20-30, 2007.

http://www.icra.it/Italian-Sino_Workshop/fourth/english/welcome.htm

June 2007: “10th Italian-Korean Symposium on Relativistic Astrophysics”, Pescara (Italy), June 25-30, 2007.

<http://www.icra.it/ITKO/10/welcome.htm>

April 2007: “2007 APS April Meeting”, Jacksonville (USA), April 14-17, 2007.

<http://meetings.aps.org/Meeting/APR07/Content/705>

February 2007: “Cesare Lattes Meeting on GRBs, Black Holes and Supernovae”, Mangaratiba (Brazil), February 25 – March 3, 2007.

http://www.icra.it/ICRA_Networkshops/lattes_meeting/first/welcome.htm

July 2006: “XI Marcel Grossmann Meeting on General Relativity”, Berlin (Germany), July 23-29, 2006.

<http://www.icra.it/mg/mg11/welcome.htm>

June 2006: “Swift and GRBs: Unveiling the Relativistic Universe”, Venezia (Italy), June 5-9, 2006.

<http://www.merate.mi.astro.it/docM/OAB/Research/SWIFT/sanservolo2006/index.html>

Ph.D. SCHOOLS

September 2007: “Fundamental Physics Using Gamma-Ray Bursts”, Venezia (Italy), September 16-22, 2007.

<http://www.merate.mi.astro.it/scuolasanservolo2007/>

September 2006: “XII Brazilian School of Gravitation and Cosmology”, Mangaratiba (Brazil), September 10-23, 2006.

<http://www.cbpf.br/~cosmogra/bscgxxii.htm>

July 2006: “Astrofisica Gamma e Multifrequenza: Analisi Dati e Problematiche Astroparticellari”, Perugia (Italy), July 3-7, 2006.

<http://glastweb.pg.infn.it/school2006/>

February 2006: “Bego Rencontre”, Nice (France), February 6-17, 2006.

http://www.icra.it/ICRA_Networkshops/

CONTRIBUTED TALKS

July 2007: **"GRB060614: a progress report"** - *"4th Italian-Sino Workshop on Relativistic Astrophysics"*, Pescara (Italy), July 20-30, 2007.

June 2007: **"GRB060614: a progress report"** - *"10th Italian-Korean Symposium on Relativistic Astrophysics"*, Pescara (Italy), June 25-30, 2007.

April 2007: **"Theoretical interpretation of GRB011121"** - *"APS April Meeting"*, Jacksonville (USA), April 14-17, 2007.

February 2007: **"Theoretical interpretation of flares"** - *"Cesare Lattes Meeting on GRBs Black Holes and Supernovae"*, Mangaratiba (Brazil), February 25-March 3, 2007.

July 2006: **"Theoretical interpretation of GRB011121"** - *"XI Marcel Grossmann Meeting on General Relativity"*, Berlin (Germany), July 23-29, 2006.

POSTERS

November 2006: **"GRB060614: a progress report"** - *"Gamma Ray Bursts 2007"*, Santa Fe (New Mexico), November 5-9, 2007

June 2006: **"Theoretical interpretation of GRB011121"** - *"Swift and GRBs: Unveiling the Relativistic Universe"*, Venezia (Italy), June 5-10, 2006

PROFESSIONAL MEMBERSHIPS

Member of the American Physical Society (APS).

Member of the Italian Physical Society (Società Italiana di Fisica (SIF)).

Member of the International Center for Relativistic Astrophysics (ICRA).

Member of the International Center for Relativistic Astrophysics Network (ICRANet).

Campion Stefano

Position: IRAP Ph.D. Student

Period covered: January 2017-January 2020



I Scientific Work

Study the production and the emission of neutrinos from GRB.

II Conferences and educational activities

II a Conferences and Other External Scientific Work

- *Workshop “ISU2015 Quest for visible and invisible strange stuff in the Universe” to INFN-LNF, Frascati (Italy), 27/11/2015*

Title: “A model for spheroidal galaxies with prevalence of radial component in the velocity distribution of stars”

2017 List of Publication

Euro pass curriculum vitae

Personal information

Surname(s) / First name(s)	Ceccobello Chiara
Address(es)	113, Ponte Assa, 44100, Ferrara, Italy
Telephone(s)	39 348 8883205
E-mail(s)	ceccobello@fe.infn.it
Nationality(-ies)	Italian
Date of birth	January, 6 th , 1984

Education and training

Dates	September 2006 – October 2008
Title of qualification awarded	<p>Graduated student of Laurea Specialistica in Physics (curriculum of Astrophysics) at the University of Ferrara.</p> <p>Final mark 110/110 cum laude.</p> <p>The title of the thesis is “Comptonization in ultra strong magnetic field: a theoretical and numerical investigation”. The tutor is Prof. Filippo Frontera with the collaboration of Prof. Lev Titarchuk and Ruben Farinelli.</p> <p>The goal of this thesis is the introduction of an ultra strong magnetic field in the investigation of the radiative transfer problem for a neutron star's thermal plasma.</p> <p>I started with the study of two Ljubarskii's papers in which the radiative transfer equation for an ultra magnetized neutron star is analitically solved with some assumptions that permit to obtain an asymthotic solution of the problem.</p> <p>I solved this equation with the separation of variables. The problem is reduced into two equations depending respectively from energy and space. The solution of the former gives us the Green's function, while the latter provides eigenvalues and eigenfunctions.</p> <p>I learnt analytical and numerical methods for the solution of the radiative problem, formulated by Lyubarskii.</p> <p>Results of this work will be published.</p>
Principal subjects/Occupational skills covered	
Dates	September 2003 – March 2006
Title of qualification awarded	Graduated student of “Laurea Triennale” in Physics and Astrophysics at the University of Ferrara.

Principal subjects/Occupational skills covered	<p>Final mark 110/110 cum laude.</p> <p>The title of the thesis is “Simulazioni di Lenti di Laue per applicazioni astrofisiche”. The tutor was Prof. Filippo Frontera, with the collaboration of Alessandro Pisa.</p> <p>We produced simulations of Laue lens for X and Gamma ray telescopes.</p> <p>We studied some possible configurations and materials of the crystals in order to obtain a good collection of the photons.</p>
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Dates	September 1998 – June 2003
Title of qualification awarded	Student of the “L. Da Vinci” Scientific Liceum in Montefiascone (VT).

Personal skills and competences

Mother tongue(s)	Italian
Other language(s)	<p>English</p> <p>Understanding: good</p> <p>Speaking: good</p> <p>Writing: good</p>
Computer skills and competences	<p>Basic knowledge of Python, C++, Linux programming languages.</p> <p>Good knowledge of Excel and Office.</p>
Other skills and competences	Basic knowledge of proportional counters.
Driving licence(s)	B level

Yen Chen Chen

Position: IRAP Ph.D. student
Period covered: 2017-2020



I Scientific Work

I am interesting relationship between AGNs and their host galaxies. I also work on data analysis and high energy astrophysics

2017 List of Publication

- Morphology of Seyfert galaxies, Yen Chen Chen & Chong Yuan Hwang, *Astrophysics and Space Science*, 362, 230 (2017)
- Two distributions of the Seyfert 2 galaxies, (submitted to MNRAS), Yen Chen Chen & Chong Yuan Hwang

Curriculum vitae et studiorum: FRANCESCO CIANFRANI

ICRA - International Center for Relativistic Astrophysics
Physics Department
University of Rome “La Sapienza”
Piazzale Aldo Moro 5
00185 Roma
Telephone: (0039) 0649914397
E-mail: francesco.cianfrani@icra.it

PERSONAL DATA

Date of birth: January 1st 1982, Isernia, Italy.
Citizenship: Italian.
Home address: via Igino Giordani 110, 00159 Roma.
Mobile telephone: (0039) 3381380761.

EDUCATION

November 2004

Department of Physics
University of Rome “La Sapienza”, Italy.

Master Degree in Physics, grade: 110/110 cum laude
(maximum score for each exam).

Master Thesis’s Advisors: Dr. [G.Montani](#), Prof. [R.Ruffini](#).
**Geometrization of the electro-weak model bosonic
component in a dimensional compactified scheme.**

July 2000

Scientific High School “Ettore Majorana”, Isernia, Italy.

Scientific high school diploma, grade: 100/100.

COMPUTER SKILLS

Operative systems: Windows.
Typesetting: Latex, WinWord, PowerPoint.
Data analysis: Excel.
Computational task: Mathematica, Maple.

LANGUAGES

Italian: Native language.
English: Fluent.

COURSES

- September-December 2006 “Quantum Field Theory” by Prof. M. Testa.
- “Group Representation Theory” by Prof. C. De Concini.
- April-June 2006 “Geometrodynamics and Matter Fields” by Prof. R. Ruffini, Dr. G. Montani.
- “Gauge Theories” by Prof. L. Maiani.
- January 2006 “Mathematical Problems of General Relativity Theory” by Prof. D. Christodoulou.
- September-December 2005 “Introduction to Quantum Gravity” by Prof. G. Amelino-Camelia.
- March-June 2005 “Algebraic Topology” by Prof. P. Piccinni.

PhD SCHOOLS

- November-December 2006 “General Relativity Trimester: Gravitational Waves, Relativistic Astrophysics and Cosmology”, Institute Henri Poincaré, Paris, September 18-December 15 2006 (last three weeks).
- September 2006 “The XIIth Brazilian school of Cosmology and Gravitation”, Rio de Janeiro, 10-23.
- February 2006 “1st Bego rencontre”, Nice, 6-16.
- September 2005 “2nd IRAP PhD Summer School”, Pescara, 5-15.

RESEARCH EXPERIENCE

- 2004-2007 *IRAP PhD student*
Supervisors: Dr. G.Montani.
Investigation of the role of spinors in a Kaluza-Klein framework;
Phenomenological consequences of undetectable dimensions;
Study of the dynamics of rotating objects in a 5-dimensional space-time;
Representation of boost transformations in a canonical Quantum Gravity setting.
- 2004 *Undergraduate student: Department of Physics, University of Rome.*
Supervisors: Dr. G.Montani, Prof. R.Ruffini.
Development of a Kaluza-Klein theory in which the geometrization of the electro-weak

model bosonic component is achieved; introduction in such a framework of spinors as matter fields; searching for a geometrical explanation for isospin doublet.

RESEARCH INTERESTS

- General Relativity.
- Kaluza-Klein models and Unification theories.
- Quantum Gravity.

PUBLICATIONS

- Cianfrani F., Montani G., “Boost invariance of the gravitational field dynamics: quantization without time gauge”, *Classical and Quantum Gravity*, **24**, (2007) 4161-4168, arXiv:0707.2854.
- Cianfrani F., Milillo I., Montani G., “Dixon-Souriau equations from a 5-dimensional spinning particle in a Kaluza-Klein framework”, *Physics Letters A*, **A366**, (2007), 7, arXiv:gr-qc/0701157.
- Cianfrani F., Montani G., “Geometrization of the electro-weak model bosonic component”, *International Journal of Theoretical Physics*, **46**, 3, (2007), 471, arXiv:gr-qc/0601052.
- Cianfrani F., Montani G., “Non Abelian gauge symmetries induced by the unobservability of extra-dimensions in a Kaluza-Klein approach”, *Modern Physics Letters*, **A21**, 3, (2006), 265, arXiv:gr-qc/0511100.
- Cianfrani F., Marrocco A., Montani G., “Gauge Theories as a Geometrical Issue of a Kaluza-Klein Framework”, *International Journal of Modern Physics*, **D14**, 7, (2005), 1095, arXiv:gr-qc/0508126.

PROCEEDINGS

- Cianfrani F., Lecian O. M., “Stueckelberg: a forerunner of modern physics”, proceedings of I Stueckelberg Workshop, June 25- July 1, 2006, Pescara, Italy, to appear on *Nuovo Cimento B*, arXiv:physics/0701340.
- Cianfrani F., Montani G., “Spinning particle in General Relativity”, proceedings of I Stueckelberg Workshop, June 25- July 1, 2006, Pescara, Italy, to appear on *Nuovo Cimento B*, arXiv:gr-qc/0701080.
- Cianfrani F., Montani G., “The Electro-Weak model as low-energy sector of 8-dimensional General Relativity”, proceedings of I Stueckelberg Workshop, June 25- July 1, 2006, Pescara, to appear on *Nuovo Cimento B*, arXiv:gr-qc/0701079.
- Cianfrani F., Montani G., “The electro-weak model as a phenomenological issue of multidimensions”, proceedings of XI Marcel Grossmann meeting on Relativistic Astrophysics, July 23-29, 2006, Berlin, arXiv:gr-qc/0610037.

-Cianfrani F., Milillo I., Montani G., “On the geometrization of the electro-magnetic interaction for a spinning particle”, proceedings of XI Marcel Grossmann meeting on Relativistic Astrophysics, July 23-29, 2006, Berlin,, arXiv:gr-qc/0610036.

ARTICLES SUBMITTED TO JOURNALS:

-Montani G., Cianfrani F., “General Relativity as Classical Limit of Evolutionary Quantum Gravity”, submitted to *Classical and Quantum Gravity*.

-Cianfrani F., Montani G., “Dirac equations in curved space-time versus Papapetrou spinning particles”, submitted to *Modern Physics Letters A*.

-Cianfrani F., Montani G., “Low-energy sector of 8-dimensional General Relativity: Electro-Weak model and neutrino mass”, submitted to *International Journal of Modern Physics D*, arXiv:gr-qc/0606040.

TEACHING EXPERIENCE

October-December 2005 lectures for the undergraduate course “Fisica Generale II” by Prof. G. Corbò at the department of mathematics, University of Rome “Sapienza”.

May 2005 lectures for the IRAP-PhD course “Relativistic Cosmology and Beyond” by Dr. G.Montani.

MEETINGS AND WORKSHOPS

September 2007 “2nd Stueckelberg workshop”, Pescara, 3-7.
he participates as a Scientific Organizing Committee.

July 2007 “4th Italian-Sino Workshop on Cosmology and Relativistic Astrophysics”, Pescara, 20-29.

July 2007 “10th Italian-Korean Symposium on Relativistic Astrophysics”, Pescara, 25-30.

April 2007 “APS April Meeting”, Hyatt Regency Riverfront Hotel, Jacksonville, Florida, 14-17.

December 2006 “High Energy, Cosmology and Strings”, Institute Henri Poincaré, Paris, 11-15.

July 2006 “XIth Marcel Grossmann Meeting”, Berlin, 23-29.

July 2006 “3rd Italian-Sino Workshop on Cosmology and Relativistic Astrophysics: Supernova, GRB and Cosmology”, Pescara, 10-20.

June 2006 “1st Stueckelberg workshop”, Pescara, 25-30.

CONTRIBUTED TALKS

- April 2007 “APS April Meeting”, Hyatt Regency Riverfront Hotel, Jacksonville, Florida, 14-17.
contribution: “Particles and fields within a unification scheme”.
- July 2006 “XIth Marcel Grossmann Meeting”, Berlin, 23-29.
contributions: “The electro-weak model as a phenomenological issue of multidimensions”,
“On the geometrization of the electro-magnetic interaction for a spinning particle”.

PROFESSIONAL MEMBERSHIPS

Member of the International Center for Relativistic Astrophysics (ICRA), American Physical Society (APS) and Italian Physical Society (SIF).

Cipolletta Federico

Position: **IRAP PhD, XI Cycle**

Period covered: **October 2012 – March 2016**



I Scientific Work

- Bachelor Degree in Mathematics, University of Camerino (MC), Italy, from a.y.2006/2007 to a.y. 2008/2009. Graduationthesis' title: "RationalTangles and ContinuedFractions". Supervisor: prof. Riccardo Piergallini.
- Master Degree in Mathematics, University of Camerino (MC), Italy, from a.y. 2009/2010 to a.y. 2010/2011. Graduationthesis' title: "Avoidance of singularities for chargedcollapsingrelativisticsolutions in sphericalsymmetry". Supervisor: prof. Roberto Giambò.
- Ph.D.title (IRAP Ph.D., XI Cycle) obtained on 22/03/2016. Thesis' title: "Structure of rotating self-gravitatingfigures of equilibrium in Newtoniangravity and general relativity with an emphasisonneutronstars". Supervisors: prof. Simonetta Filippi and prof. Jorge A. Rueda.
- April 2016 to October 2016, I obtained a short-termcollaborationcontract (6 months) with CNR group of prof. Sauro Succi, to work in Electrospinning. My job was to modify, test and implement a public domain Fortran code (JETSPIN), to numerically model the electrospinningprocess. Then I statisticallystudied the results (moment 1, 2 and 3 of distribution; interquartile range; joint probability; bidimensionalhistograms).
- From January 2017, I havebeenhiredas "ResearchTechnician for IndustrializationProcesses" by the Sigma s.p.a. company at the offices in Rubbianello (FM), in order to take care of severalproblemsconcerning the slightbutcontinuous ex- pansion of the company. My actualduties up to the moment are: 1- write some macros in vb.NET, VBA or Python to automate some duties that must be done with the Siemens NX CAD software (likemakingevaluations of costs of designedmodels and so on); 2- retrieve, collect and organize the documentationconcerningparts painting and protectivecoating in order to makethe production processlessdependent from particularsupplier and to integrate suchmissingdocumentation; 3- build up a code in order to statisticallyanalyseimportant data (likenumber of transactions or number of in fieldintervention on installedmachineries) with the purpose to forecasttheirvalues in the immediate future.

II Conferences and educational activities

- Nice BEGO school, May 2013
- 2013 ICRANet meeting onRelativisticAstrophysics on the Occasion of the 50th anniversary of the Kerr solution of the Einstein'sequations in Pescara
- Nice BEGO school, September 2013 -NiceWinterschoolFrebruary 23– March 2 2014

- “Supernovae, Gamma-raybursts and the Inducedgravitationalcollapse”, May 11-16, 2014 – LesHouches (France)
- “Third BEGO Rencontres – IRAP PhD Erasmus Mundus School”, September 8-19, 2014 – Nice (France)
- “Fourteenth Marcel Grossmann Meeting - MG14”, July 12-18, 2015 - Rome (Italy)
- “14th Italian-Korean Symposium on RelativisticAstrophysics”, July 20-24, 2015 - Pescara (Italy)
- “Supernovae, Hypernovae and BinaryDrivenHypernovae- An Adriatic Workshop”, June 20 2016 - Pescara (Italy)

III. Service activities

Talks:

- “RapidlyRotatingNeutron Stars in full GR”, during “Third BEGO Rencontres – IRAP PhD Erasmus Mundus School”, September 8-19, 2014;
- *Structure And Stability For RealisticRapidlyRotatng NS: Full GR Treatment*, during “Fourteenth Marcel Grossmann Meeting - MG14”, Rome (Italy), July 12-18 2015;
- *Structure And Stability For RealisticRapidlyRotating NS: Full GR Treatment*, during “14th Italian-Korean Symposium onRelativisticAstrophysics”, Pescara (Italy), July 20-24 2015;
- *Models for equilibriumconfigurations of rotating self-gravitatingPolytropic Stars*, during “14th Italian-Korean Symposium onRelativisticAstrophysics”, Pescara (Italy), July 20-24 2015;
- *Structure of relativistic, rapidlyrotatingNeutron Stars: interior and exteriorspacetime*during “Supernovae, HypernovaeandBinaryDrivenHypernovae- An Adriatic Workshop”, Pescara (Italy), June 20 2016.

IV. Other

April 2016 – October 2016: Short-termcollaborationcontract with CNR group of prof. Sauro Succi in Rome.

2016 List of Publication

Proceedings:

- “Black holes, neutronstars and supernovaewithin the inducedgravitationalcollapseparadigm for GRBs”, L. Becerra, C. L. Bianco, F. Cipolletta et al. AIP Conf.Proc. 1693, 020002 (2015);
- “Physics and astrophysics of neutronstars”, R. Belvedere, F. Cipolletta et al. AIP Conf.Proc. 1693,

030001 (2015);

Published Papers:

- “*Effects of orthogonal rotating electric fields on the electrospinning process*” M. Lauricella, F. Cipolletta, G. Pontrelli, D. Pisignano, S. Succi, Physics of Fluids, 29.8, 082003, Published online: August 2017, Accepted: July 2017.
- “*Last stable orbit around a rapidly rotating neutron star*”, F. Cipolletta, C. Cherubini, S. Filippi, J. A. Rueda, R. Ruffini, Phys. Rev. D 96, 024046, Published 25 July 2017.
- “*Equilibrium Configurations of Classical Polytropic Stars with a Multi-Parametric Differential Rotation Law: A Numerical Analysis*”, F. Cipolletta, C. Cherubini, S. Filippi, J. A. Rueda, R. Ruffini, Communications in Computational Physics, 22.3: 863-888, Published September 2017, Published online: 06 July 2017.
- “*Angular Momentum Role in the Hypercritical Accretion of Binary-Driven Hypernovae*”, L. M. Becerra, F. Cipolletta, C. L. Fryer, J. A. Rueda, R. Ruffini, ApJ, 812, 100, Published 13 October 2015;
- “*Fast rotating neutron stars with realistic nuclear matter equation of state*”, F. Cipolletta, C. Cherubini, S. Filippi, J. A. Rueda, R. Ruffini, Phys. Rev. D 92, 023007, Published 13 July 2015;
- “*COLLAPSE OF SPHERICAL CHARGED ANISOTROPIC FLUID SPACETIMES*”, Federico Cipolletta and Roberto Giambó 2012, Class. Quantum Grav. 29 245008. doi:10.1088/0264-9381/29/24/245008, Received 3 August 2012, in final form 15 October 2012, Published 19 November 2012;

In Preparation:

- “*On the accuracy of the Hartle-Thorne approximation in realistic rapidly rotating neutron stars*”, Authors: L. M. Becerra, R. C. Rodrigues, F. Cipolletta, J. A. Rueda, R. Ruffini;
- “*Suitability of Analytical Formulas for the Determination of the Neutron Star Keplerian Frequency and Moment of Inertia*”, Authors: R. Belvedere, J. A. Rueda, L. M. Becerra, F. Cipolletta, R. Ruffini;

Curriculum vitae et studiorum:

Maria Giovanna Dainotti

ICRA - International Center for Relativistic Astrophysics,
Department of Physics,
University of Rome “La Sapienza”,
Piazzale Aldo Moro 5,
00185 Roma.
Telephone: (0039) 0649914397.
Fax: (0039) 064454992.
E-mail: dainotti@icra.it.

PERSONAL DATA:

Date and place of birth: April 11th 1978, Salerno, Italy.
Citizenship: Italian.
Home address: Corso Umberto I 395, 84013 Cava dei tirreni.
Home telephone: (0039) 089 443527.
Mobile telephone: (0039) 3395060254.

EDUCATION:

November 05 (3 years) *Department of Physics and ICRA (International Center for Relativistic Astrophysics), University of Rome “La Sapienza”.*

Admitted to the International Relativistic Astrophysics Ph.D. Program (IRAP PhD) granted with a fellowship by the six participating institutions: ETH Zurich, Freie Universität Berlin, Observatoire de la Côte d’Azur, Université de Nice-Sophia Antipolis, Università di Roma “La Sapienza”, Université de Savoie, <http://www.icra.it/IRAPPhD/>.

July 2005 *Department of Physics, University of Rome “La Sapienza”.* Master Degree (Laurea) in Physics, grade: 110/110 cum laude,

Master Thesis’s Advisor: Prof. S.Capozziello.

Standard candles and lookback time as methods to test cosmological models

July 1997 *Classic High School “Marco Galdi” in Cava de’ Tirreni*

Classic high school diploma, grade: 60/60.

RESEARCH INTERESTS:

- High energy astrophysics
- Gamma ray burst: both theoretical aspects and data analysis.
- Standard candles as probing tools of cosmology.

COMPUTER SKILLS:

Operating systems: Windows (very good), Tru64 Unix (basic), Linux (basic), Matlab (basic)

Typesetting and Presentations: \LaTeX (very good), Microsoft Office (very good).

Data analysis: Gnuplot (very good), Excel (very good)

Computational task: Mathematica (fair), Fortran (good).

LANGUAGES:

Italian: Native language.

English: upper intermediate level.

Spanish: Reading comprehension.

French: Reading comprehension.

PUBLICATIONS IN REFEREED JOURNALS:

- Dainotti M. G., Bernardini M. G., Bianco C. L., Caito L., Guida R., Ruffini R., “GRB060218 and GRBs associated to Supernovae Ib/c”, **Astron. & Astrophys.**, **471**, **L29**, **2007**.

- Bernardini M. G., Bianco C. L., Caito L., Dainotti M. G., Guida R., Ruffini R., “GRB970228 and a class of GRBs with an initial spikelike emission”, to appear on **Astron. & Astrophys. Letters**, **arXiv:0709.0651**, **2007**.

- Bernardini M. G., Bianco C. L., Caito L., Chardonnet P., Corsi A., Dainotti M. G., Frascchetti F., Guida R., Ruffini R., Xue S. S., “GRB970228 as a prototype for short GRBs with afterglow”, **Nuovo Cimento**, **121B**, **1439**, **2006**.

PUBLICATIONS IN PREPARATION:

- Dainotti M. G., Bernardini M. G., Bianco C. L., Caito L., Guida R., Ruffini R., “The comparison between GRB060218 and all other GRBs within the fireshell model” (in preparation)

- Dainotti M. G. et al. “GRB are standard candles?” (in preparation)

.

PROCEEDINGS:

Dainotti M. G., Bernardini M. G., Bianco C. L., Caito L., Guida R., Ruffini R., “On GRB 060218 and binaries as progenitors of GRB-SN systems”, in the Proceedings of “4th Italian-Sino Workshop on Relativistic Astrophysics” in Pescara, Italy, July 20-30, 966, 25, 2007.

-Bernardini M. G., Bianco C. L., Caito L., Dainotti M. G., Guida R., Ruffini R., Xue S. S., “GRB 970228 and the class of GRBs with initial spikelike emission: do they follow the Amati relation?”, in the Proceedings of “4th Italian-Sino Workshop on Relativistic Astrophysics” in Pescara, Italy, July 20-30, 966, 7, 2007.

-Caito L., Bernardini M. G., Bianco C. L., Dainotti M. G., Guida R., Ruffini R., “GRB060614: a progress report” in the Proceedings of “4th Italian-Sino Workshop on Relativistic Astrophysics” in Pescara, Italy, July 966, 16, 2007.

- Guida R., Bernardini M. G., Bianco C. L., Caito L., Dainotti M. G., Ruffini R., “The Amati relation within the fireshell model” in the Proceedings of “4th Italian-Sino Workshop on Relativistic Astrophysics” in Pescara, Italy, July 20-30, 966, 46, 2007.

-Bianco C. L., Bernardini M. G., , Caito L., Dainotti M. G., Guida R., Ruffini R., “The fireshell model and the GRB scenario” in the Proceedings of “4th Italian-Sino Workshop on Relativistic Astrophysics” in Pescara, Italy, July 20-30, 966, 12, 2007.

- Ruffini R., Bernardini M. G., Bianco C. L., Caito L., Chardonnet P., Dainotti M. G., Frascchetti F., Guida R., Rotondo M., Vereshchagin G., Vitagliano L., Xue S. S., “The Blackholic energy and the canonical Gamma-Ray Burst”, in the Proceedings of “XII Brazilian School of Cosmology and Gravitation” in Mangaratiba, Brazil, September 10-23, 2006, **AIP Conference Proceedings**, **910**, **55**, **2007**.

Dainotti M. G., Bernardini M. G., Bianco C. L., Caito L., Guida R., Ruffini R., “On GRB 060218 and

the GRBs related to Supernovae Ib/c”, in the Proceedings of “XI Marcel Grossmann meeting on General Relativity” in Berlin, Germany, July 23-29, 2006, in press.

- Guida R., Bernardini M. G., Bianco C. L., Caito L., Chardonnet P., Dainotti M. G., Fraschetti F., Ruffini R., Xue S. S., “Theoretical interpretation of GRB060124”, in the Proceedings of “XI Marcel Grossmann meeting on General Relativity” in Berlin, Germany, July 23-29, 2006, in press.

-Bernardini M. G., Bianco C. L., Caito L., Chardonnet P., Corsi A., Dainotti M. G., Fraschetti F., Guida R., Ruffini R., Xue S. S., “GRB970228 as a prototype for the class of GRBs with an initial spikelike emission”, in the Proceedings of “XI Marcel Grossmann meeting on General Relativity” in Berlin, Germany, July 23-29, 2006, in press.

Bernardini M. G., Bianco C. L., Caito L., Chardonnet P., Corsi A., Dainotti M. G., Fraschetti F., Guida R., Ruffini R., Xue S. S., “GRB980425 and puzzling URCA 1 emission”, in the Proceedings of “XI Marcel Grossmann meeting on General Relativity” in Berlin, Germany, July 23-29, 2006, in press.

Caito L., Bernardini M. G., Bianco C. L., Dainotti M. G., Guida R., Ruffini R., “Theoretical interpretation of GRB011121”, in the Proceedings of “XI Marcel Grossmann meeting on General Relativity” in Berlin, Germany, July 23-29, 2006, in press.

- Ruffini R., Bernardini M. G., Bianco C. L., Caito L., Chardonnet P., Dainotti M. G., Fraschetti F., Guida R., Rotondo M., Vereshchagin G., Vitagliano L., Xue S. S., ”Gamma Ray Bursts” in the Proceedings of “XI Marcel Grossmann meeting on General Relativity” in Berlin, Germany, July 23-29, 2006, in press.

-Bianco C. L., Bernardini M. G., , Caito L., Dainotti M. G., Guida R., Ruffini R., “The fireshell model and the Swift Era” in the Proceedings of “XI Marcel Grossmann meeting on General Relativity” in Berlin, Germany, July 23-29, 2006, in press.

-Bianco C. L., Bernardini M. G., , Caito L., Dainotti M. G., Guida R., Ruffini R., “Theoretical interpretation of short and long GRBs” in the Proceedings of “XI Marcel Grossmann meeting on General Relativity” in Berlin, Germany, July 23-29, 2006, in press.

-Bianco C. L., Bernardini M. G., , Caito L., Dainotti M. G., Guida R., Ruffini R., “Theoretical interpretation of luminosity and spectral properties of GRB 031203” in the Proceedings of “XI Marcel Grossmann meeting on General Relativity” in Berlin, Germany, July 23-29, 2006, in press.

Ph.D. SCHOOL ATTENDED:

September 2007 “Scuola Nazionale di Astrofisica IX ciclo”, Venezia (Italy), September 16-22, 2007,
<http://www.merate.mi.astro.it/scuolasanservolo2007>

September 2006 “XII Brazilian School of Gravitation and Cosmology”, Mangaratiba (Brazil), September 10-23, 2006, [http://www.cbpf.br/\\$\sim\\$cosmogra/bscgxxii.htm](http://www.cbpf.br/\simcosmogra/bscgxxii.htm).

July 2006 “Astrofisica Gamma e Multifrequenza: Analisi Dati e Problematiche Astroparticellari”, Perugia (Italy), July 3-7, 2006, <http://glastweb.pg.infn.it/school2006/index.htm>.

February 2006 “1st Bego Scientific Rencontre”, Nice (France), February, 6-17, 2006.
<http://www.icra.it/IRAPPhD/Bego/First/Welcome.htm>.

January 2006 “Mathematical Problems in General Relativity”, at ETH in Zurich (Switzerland)
by Prof. Christodoulou on January, 8-31, 2006.

February -April 2007 “From classical to quantum gravity”,
at “La Sapienza” in Rome (Italy) by Dr Montani.

April -June 2006 “ Geometrodynamics and matter fields ”
at “La Sapienza” in Rome (Italy) by Dr Montani.

November 2005-June 2006 “Theoretical physic: general relativity, cosmology, gravitational collapse”
at “La Sapienza” in Rome (Italy) by Prof. Ruffini.

November 2006-June 2007 “Gravitational physic and relativistic linear theory of elettrodinamic”
at “La Sapienza” in Rome (Italy) by Prof. Ruffini.

2005 - Present Weekly seminars on high energy astrophysics, cosmology and general relativity
held at University of Rome “La Sapienza”.

MEETINGS AND WORKSHOPS ATTENDED:

- September 2007 “The II Stueckelberg Workshop on Relativistic Field Theories”,
Pescara (Italy), September 3-7, 2007.
- July 2007 : ”4th Italian-Sino Workshop on Relativistic Astrophysics”, Pescara (Italy), July 20-30, 2007.
http://www.icra.it/Italian-Sino_Workshop/fourth/english/welcome.htm
- July 2007 : ”Astrofisica Gamma dallo Spazio: AGILE e GLAST”, Frascati (Italy), July 2-3, 2007.
http://glast.pi.infn.it/ASI_Workshop/index.htm
- June 2007 “10th Italian-Korean Symposium on Relativistic Astrophysics“, Pescara, (Italy),
June 25-30, 2007, . <http://www.icra.it/ITK0/10/welcome.htm>.
- April 2007 “The April Meeting 2007 of the American Physical Society”, Jacksonville (Florida),
April 14-17, 2007 <http://www.aps.org/meetings/april/index.cfm>.
- February 2007 “I Cesare Lattes meeting on Gamma-Ray Bursts, Black Holes and Supernovae”,
Mangaratiba (Brazil), February 25 - March 3, 2007,
http://www.icra.it/ICRA_Networkshops/lattes_meeting/first/welcome.htm.
- November 2006 ‘Swift Birthday 2006’, Merate (Italy), November 30-1 December, 2007.
<http://www.merate.mi.astro.it/swiftbirthday06>.
- May 2006 ‘ENEA per la tecnologia e il territorio’ , Rome (Italy), 17 May, 2006.
<http://www.enea.it>
- July 2006 “XI Marcel Grossmann Meeting on General Relativity”, Berlin (Germany), July 23-29,
<http://www.icra.it/mg/mg11/welcome.htm>.
- June 2006 ”Swift and GRBs: Unveiling the Relativistic Universe” in Venice, Italy, June 5-9, 2006.
.
<http://www.merate.mi.astro.it/docM/OAB/Research/SWIFT/sanservolo2006/index.html>.

Contributed talks:

July 2007 “GRB 060218 and the binaries as progenitors of GRB-SN system”, presented at the “4th Italian-Sino Workshop on Relativistic Astrophysics”,
Pescara (Italy), July 20-30, 2007,
http://www.icra.it/Italian-Sino_Workshop/fourth/english/welcome.htm.

June 2007 “GRB 060218 and the comparison with the other GRBs ”, presented at the “10th Italian- Korean Symposium on Relativistic Astrophysics”,
Pescara (Italy), June 25-30, 2007,
.
<http://www.icra.it/ITK0/10/welcome.htm>.

April 2007 “GRB060218: a good example of GRB-SN connection”, presented at the “The April Meeting 2007 of the American Physical Society”,
Jacksonville (Florida), April 14-17, 2007,

<http://www.aps.org/meetings/april/index.cfm>.

February 2007 “GRB 060218 within the theoretical framework of the fireshell”, presented at the “Cesare Lattes meeting on Gamma-Ray Bursts, Black Holes and Supernovae”, Mangaratiba (Brazil),
February 25 - March 3, 2007,

http://www.icra.it/ICRA_Networkshops/lattes_meeting/first/welcome.htm

September 2006 “On GRBs 060218: one of the most peculiar source”,
presented at “XII Brazilian School of Gravitation and Cosmology”,
Mangaratiba (Brazil), September 10-23, 2006,
[http://www.cbpf.br/\\$\sim\\$cosmogra/arquivos/princbscg.htm](http://www.cbpf.br/\simcosmogra/arquivos/princbscg.htm).

July 2006 “On GRB 060218 and the GRBs related to Supernovae Ib”, presented at “XI Marcel Grossmann Meeting on General Relativity”, Berlin (Germany), July 23-29, 2006,

<http://www.icra.it/mg/mg11/welcome.htm>.

Poster:

June 2006 : "Theoretical interpretation of GRB970228" in the conference
"Swift and GRBs: Unveiling the Relativistic Universe", Venezia (Italy), June 5-10, 2006.

November 2007 : "Short and canonical GRBs";
"Gamma-Ray Bursts 2007", Santa Fe, New Mexico (USA), November 5-9, 2007.

November 2007 "Theoretical interpretation of the Amati relation within the "Fireshell" model";
"Gamma-Ray Bursts 2007", Santa Fe, New Mexico (USA), November 5-9, 2007.

November 2007 "GRB060614: a progress report" "Gamma-Ray Bursts 2007", Santa Fe, New Mexico (USA), November 5-9, 2007.

RESEARCH EXPERIENCE:

2005 - Present *IRAP Ph.D. Program.*

Advisor: Prof. R. Ruffini.

I study theoretical models of Gamma-Ray Bursts (GRBs). Initially I focused in the analysis of GRB060218, one of the most debated source for its peculiarity, obtaining a perfect fit. I suggested further advancements for the theoretical GRB model developed in my group (the fireshell model). Particularly I proposed a new interpretation of the GRB CircumBurst Medium (CBM) that now I am applying to other GRBs. The study of GRB060218 is the starting point to deepen several issues of astrophysic. I am studying the CBM in the current literature in order to compare the CBM behavior of different models. I showed analogies with the fragmented density of the GRBs and filling factor characterizing Novae, another transient astrophysical phenomenon. Furthermore I tested the range of the applicability of the parameters within the model to find the maximum allowed theoretical value of the model's parameters to guarantee the dynamical stability of the fireshell. I compare this source with the other already analyzed. I studied the possible correlation between GRBs and Supernovae (SNe), a very debated issue in the current literature. I tried to find a way to discriminate GRBs associated with SNe and the ones which are not. Some of these results have already been published in A & A Letters. I also studied GRB970228 especially its environment compared to the GRB060218 environment. Within the GRB-SN association context, I am facing in the general topic of binary system, in particular a system composed by neutron star and a companion star evolved out the main sequence. I am also studying GRBs to find a defined luminosity function in order to consider GRBs as standard candles. I am trying to test with GRBs the existing cosmological models in order to find the better value of the Hubble constant, which is an open and current topic, and the other cosmological parameters. I learned the necessary tools to face with this problem such as some statistical techniques to fit data such as the Cash method and Kolmogorov Smirnov test and Kolmogorov Smirnov test2 and obviously the traditional method of analysis such as the chi square method.

2004-2005 *Undergraduate student*

Advisor: Prof. S. Capozziello.

I studied the distance indicators of the first, the second level and the cosmological models. The most common method to determine distances is to construct a ladder in which every step allows to estimate distances belonging to succeeded steps. The bias affects the definite determination of the distances and are of 10%- 20% if we consider nearby stars and galaxies. But every step of the distance scale carry 10% of error, so for greater distances the problem can not be undervaluated. I tried to find the distance indicators which have smaller bias to test the best cosmological models. The test of the cosmological models is drawn by the best estimate of the cosmological parameters, such as the Hubble constant, the deceleration and density parameter. The lookback time is a new method of determining distances. It is a temporal and not spatial indicator. So it is not affected by the spatial bias, typical of the standard indicators. The distance indicators used for the comparison are the SNIa, the fluctuations of the brightness surfaces (SFB), the luminosity function of the globular cluster (GCLF), Tully Fisher(TF), the Virgo cluster.

From the analysis of three classes of cosmological models, dark energy , Λ CDM and the density parametric model, it is possible to draw some conclusions. The model of parametric density is the best because it has

the lowest value of chi square, while the model of Λ CDM have to be discarded for a high value of chi square. The dark energy model can be yet considered because the value of chi square is not very higher than those of the density parametric model. The method can be used as cosmic clock applied to galaxy cluster or to quasars and together with the spatial standard candles can constrain the cosmological parameters.

2004 - 2005 Undergraduate student: Department of Physics, University of Rome, Geophysics
Supervisors: Prof. S. De Martino.

The annual study 2004-2005 of Saharian aerosols throughout Light detection and ranging (Lidar). I performed the analysis of the tropospheric aerosol at CNR in Tito Scalo, Potenza(Italy) from may 2004 to may 2005. The aerosol are important in the radiative budget for direct and indirect effects. I studied the instrumental apparatus to measure aerosol and the atmospheric phenomena such as Rayleigh, Mie, Raman, elastic scattering. The aerosol have different sizes: dust aerosol are greater than the sea, urban and black carbon aerosol. I studied the analytic maps to select the days in which the were dust aerosol. The analytical backtrajectories are good instruments to see where the dust comes from and i double checked with TOMS data the aerosol index in order to be sure of the nature of the aerosol and of their origin. I separated the signal from the noise to have the profile both of the backscatter and transmission coefficient of the light. These two quantyties are necessary to compute the lidar ratio (LR) which depends on the chemical composition of the aerosol. So LR is an another way of checking the origin of the aerosol.I distinguish the aerosol which comes from the centre, the ovest and the east of the Sahara. The statistical study the majority of the events comes from the centre of the Sahara in the summer, from the west in the spring. The difference between the centre and the west depends on the weather variability during the season.

TECHNICAL AND OBSERVATIONAL EXPERIENCE:

I have a very good experience mainly in the interpretation of data in gamma and X rays.

I have a basic experience in data analisys, with Bat, Integral and mainly in XRT data. I learned the data analysis during the school of “Astrofisica Gamma e Multifrequenza: Analisi Dati e Problematiche Astroparticellari”, Perugia (Italy), July 3-7, 2006,

EXAMS RELATED TO TECHNICAL AND OBSERVATIONAL EXPERIENCE:

I hel observational and technical exams with the following marks: astrophysical laboratoty 30/30 cum laude, optical devices 30/30, computational physic 30/30, nuclear laboratory 30/30, acquisition data 30/30, physical environment and atmosphere 30/30.

PROFESSIONAL MEMBERSHIPS:

Member of the American Physical Society (APS).

Member of the International Center for Relativistic Astrophysics (ICRA).

Member of the International Network of the Centers for Relativistic Astrophysics (ICRAnet).

Member of the Italian Society of Physics (SIF).

curriculum de barros

Personal Data

Full Name	de Barros, Gustavo
Place, date of birth	Rio de Janeiro – Brasil, 18 March of 1983
Nationality	Brazilian
Sex, Marital Status	Male, Single

Education

2006–now	<i>PhD in Relativistic Astrophysics</i> , International Center for Relativistic Astrophysics, University of Rome “La Sapienza”, Rome–Italy Second Year, the degree will be earned on November 2009.
2004–2006	<i>Master in Astronomy</i> , Observatório do Valongo, Universidade Federal do Rio de Janeiro, Rio de Janeiro - RJ - Brasil
2000–2004	<i>Bachelor in Physics</i> , Instituto de Física, Universidade Estadual do Rio de Janeiro, Rio de Janeiro - RJ - Brasil
2000–2004	<i>Licenciate in Physics</i> , Instituto de Física, Universidade Estadual do Rio de Janeiro, Rio de Janeiro - RJ - Brasil

Languages

Native	Portuguese
Very good	Italian
Good	Spanish, English
Little	French, German

Computing Skills

Operative Systems	Windows
Programming Languages	Fortran (77) Numerical Methods in Physics

Scientific	Maple, Mathematica	Symbolic and Numeric Calculus
Plotting Engines	Gnuplot, Microcal Origin, Excel	Visualization of mathematical functions and data
Typography	Latex, OpenOffice, Word	Typography of scientific texts

Research interests

Cosmology

General Relativity

High Energy Astrophysics: Gamma Ray Bursts

Publications

- 2004 *Assimetria Gaussiana e Formação de Estruturas*. VILLAS DA ROCHA, Jaime F.; BARROS, Gustavo de. Boletim da Sociedade Astronômica Brasileira, v. 25, n.1, 2004.
- 2003 *Gradientes Conjugados, uma compilação detalhada*. CORRÊA, Eduardo Dias; BARROS, Gustavo de; CARVALHO, Luiz M. In: XXVI Congresso Nacional de Matemática Aplicada e Computacional, 2003, São José do Rio Preto. Anais do XXVI CNMAC, 2003. v. 1. p. 290-290.
- 2002 *Centro de referência para a solução de sistemas lineares*. BARROS, Gustavo de; CORRÊA, Eduardo Dias; CARVALHO, Luiz M. In: XXV Congresso Nacional de Matemática Aplicada e Computacional, 2002, Nova Friburgo. Anais do XXV Congresso Nacional de Matemática Aplicada e Computacional. Rio de Janeiro: SBMAC, 2002. v. 1. p. 35-35.
- 2002 *Métodos iterativos em Scilab com comunicação reversa*. CORRÊA, Eduardo Dias; BARROS, Gustavo de; CARVALHO, Luiz M. In: XXV Congresso Nacional de Matemática Aplicada e Computacional, 2002, Nova Friburgo. Anais do XXV Congresso Nacional de Matemática Aplicada e Computacional. Rio de Janeiro : SBMAC, 2002. v. 1. p. 113.
- 2001 *Tracing Limitations of Dense Astrometric Catalogues Using the Valinhos Radio Stars Program*. ANDREI, A. H.; PENNA, Jucira Lousada; ASSAFIN, Marcelo; BARROS, G. In: XXVII Reunião Anual da Sociedade Astronômica Brasileira, 2001, Águas de São Pedro (São Paulo). Boletim da Sociedade Astronômica Brasileira, 2001. v. 21. p. 85-86.

Meetings, Courses and Workshops

September-2007 "Scuola Nazionale di Astrofisica" Venezia - Italia, Sep. 16-22.

July-2007 "IV Italian-Sino Workshop on Relativistic Astrophysics", Pescara - Italia, Jul. 20-30.

- June-2007 "X Italian-Korean Symposium on Relativistic Astrophysics", Pescara - Italia, Jun. 25-30.
- February-2007 "Cesare Lattes Meeting on GRB's, Black Holes and Supernovae", Rio de Janeiro - Brasil, Feb. 25 - Mar. 3.
- December-2006 "High Energy, Cosmology and Strings" Paris - France, Dec. 11-15.
- November-2006 "From geometric to numerics" Paris - France, Nov. 20-24.
- November-2006 "Gravitational Wave Data Analysis" Paris - France, Nov. 13-17.
- September-2005 "INPE Advanced Course I - A roadmap for cosmology" São José dos Campos - SP - Brasil, Sep. 12-16.
- August-2005 "100 Years of Relativity International Conference", São Paulo - Brasil, Aug. 22-24
- July-2005 "XXXI Reunião Anual da Sociedade Astronômica Brasileira.", Águas de Lindóia - SP - Brasil, Jul. 31 - Aug. 4.
- August-2004 "XXV Brazilian Meeting of Particles Physics and Fields", Caxambu - MG - Brasil, Aug. 24-28.
- August-2004 "XXX Reunião Anual da Sociedade Astronômica Brasileira.", São Pedro - SP - Brasil, Aug. 8-12
- September-2003 "XXIV Encontro Nacional de Física de Partículas e Campos.", Caxambu - MG - Brasil, Sep. 30 - Oct. 04
- August-2003 "XXIX Reunião Anual da Sociedade Astronômica Brasileira.", São Pedro - SP - Brasil, Aug. 3-7
- May-2003 "XXVI Encontro Nacional de Física da Matéria Condensada.", Caxambu - MG - Brasil, May 6-10
- September-2002 "XXV Congresso Nacional de Matemática Aplicada e Computacional.", Nova Friburgo - RJ - Brasil, Sep. 16-19.

Dichiara Simone

Position: Post-doc

Period covered: from 01/09/2016 until present



I Scientific Work

I'm currently working on the data analysis of data collected by the High Altitude Water Cherenkov gamma-ray observatory (HAWC). As part of the HAWC collaboration I'm mainly involved in the search of gamma-ray burst (GRB) counterpart and other transients at very high energies (GeV-TeV range). I contributed to develop the software used for the analysis and the follow-up procedures. Together with my collaborators we developed the equations for the emission predicted at very high energies by the Synchrotron Self-Compton radiative model in the framework of an external shock scenario. Comparing these prediction with the flux upper limits derived by HAWC we find a way to constrain the micro-physical parameters, the density of the external medium and the Lorentz factor of the expanding blast wave (Dichiara et al. 2017, HAWC collaboration in preparation)

II Conferences and educational activities

II a Conferences and Other External Scientific Work

- May 2012, Munich (Germany), “Fermi/Swift GRB conference 2012”
poster, title: “An investigation of the impact of selection and instrumental effects on the observed E_p - E_{iso} correlation”
- September 2012, Naples (Italy), “III Congresso nazionale GRB 2012 - Lampi su Napoli”
talk, title: “Average power density spectra of long GRBs detected with BeppoSAX/GRBM and with Fermi/GBM”
- April 2014, Ferrara (Italy), “PRIN Meeting on Gamma Ray Bursts”
talk, title: “A search for pulsations in short GRB to constrain their progenitors”
- September 2013, Ferrara (Italy), “VIII CNOC”
national conference on astrophysics of compact objects) – organizer
- July 2017, Busan (Korea), “35th International Cosmic Ray Conference (ICRC2017)”, poster,
title: “Search of extended or delayed TeV emission from GRBs with HAWC”
- October 2017, Garmisch-Partenkirchen (Germany), “7th International Fermi symposium”,
talk, title: “Constraints on microphysical parameters of GRBs using HAWC”
- October 2017, Monterrey (Mexico), “XXVI Congreso Nacional de Astronomía”,

talk, title: “Investigando la fisica de los GRBs con HAWC”

- November 2017, Cocoyoc (Mexico), “HAWC collaboration meeting”, talk, title: “Search of very high energy emission from GRBs using HAWC”
- December 2017, Playa del Carmen (Mexico), “Deciphering the Violent Universe”, talk, title: “Search of very high energy emission to constrain the physics of GRBs”

II b Work With Students

- workshop on Fermi data analysis

II c Diploma thesis supervision

-

II d Other Teaching Duties

-

II e. Work With Postdocs

-

III. Service activities *[activities carried out in collaboration with ICRANet (e.g. teaching activities, conferences etc...) and outside ICRANet (teaching activities in your university etc...)]*

III a. Within ICRANet

III b. Outside ICRANet

Teaching activity:

course: “Multi-messenger astrophysics”

from February to June 2018

Astronomy Institute – UNAM

IV. Other

2017 List of Publication

- Dichiara, S.; Guidorzi, C.; Amati, L.; Frontera, F.; Margutti, R., 2016, Astronomy & Astrophysics, 589, article id. A97, “A correlation between peak energy and Fourier power density spectrum slope in gamma-ray bursts”

- Dichiara, S.; Guidorzi, C.; Amati, L.; Frontera, F., 2013, Monthly Notices of the Royal Astronomical Society, 431, 3608-3617, “Average power density spectrum of long GRBs detected with BeppoSAX/GRBM and with Fermi/GBM”
- Dichiara, S.; Guidorzi, C.; Frontera, F.; Amati, L., 2013, The Astrophysical Journal, 777, article id. 132, “A Search for Pulsations in Short Gamma-Ray Bursts to Constrain their Progenitors”
- Guidorzi, C.; Dichiara, S.; Amati, L.; Astronomy & Astrophysics, 589, article id. A98, “Individual power density spectra of Swift gamma-ray bursts”
- Guidorzi, C.; Dichiara, S.; Frontera, F.; Margutti, R.; Baldeschi, A.; Amati, L., 2015, The Astrophysical Journal, 2015, The Astrophysical Journal, 801, article id. 57, “A common stochastic process rules gamma-ray burst prompt emission and X-ray flares”
- Frontera, F.; Amati, L.; Farinelli, R.; Dichiara, S.; Guidorzi, C.; Landi, R.; Titarchuk, L., 2013, The Astrophysical Journal, 779, article id. 175, “Comptonization Signatures in the Prompt Emission of Gamma-Ray Bursts”
- Frontera, F.; Amati, L.; Farinelli, R.; Dichiara, S.; Guidorzi, C.; Landi, R.; Titarchuk, L., 2013, International Journal of Modern Physics D, 25, issue 5, id. 1630014, “Possible physical explanation of the intrinsic $E_{p,i}$ -“intensity” correlation commonly used to “standardize” GRBs”
- Fraija, N.; De Colle, F.; Veres, P.; Dichiara, S.; Barniol Duran, R.; Galvan-Gamez, A., L., 2018, The Astrophysical Journal, submitted, “The short GRB 170817A: Modelling the off-axis emission and implications on the ejecta magnetization”
- Dereli, H.; Boër, M.; Gendre, B.; Amati, L.; Dichiara, S.; Orange, N. B., 2017, The Astrophysical Journal, 850, article id. 117, A Study of GRBs with Low-luminosity Afterglows
- D. Kopac, C. G. Mundell, J. Japelj, D. M. Arnold, I. A. Steele, C. Guidorzi, S. Dichiara, S. Kobayashi, A. Gomboc, R. M. Harrison, G. P. Lamb, A. Melandri, R. J. Smith, F. J. Virgili, A. J. Castro-Tirado, J. Gorosabel, A. Jarvinen, R. Sanchez-Ramirez, S. R. Oates, M. Jelinek, 2015, The Astrophysical Journal, 813, article id. 1, "Limits on optical polarization during the prompt phase of GRB 140430A"
- Castignani, G.; Guetta, D.; Pian, E.; Amati, L.; Puccetti, S.; Dichiara, S., 2014, Astronomy & Astrophysics, 565, id.A60, “Time delays between Fermi-LAT and GBM light curves of gamma-ray bursts”
- Amati, Lorenzo; Dichiara, Simone, 2013, Acta Polytechnica (supplement), 53, 686, “Investigating the $E_{p,i}$ –Eiso Correlation”
- K. D. Alexander, T. Laskar, E. Berger, ..S. Dichiara et al, 2017, The Astrophysical Journal, 848, article id 69, “A REVERSE SHOCK AND UNUSUAL RADIO PROPERTIES IN GRB 160625B”

- Abbott, B. P.; Abbott, R.; Abbott, T. D.; , ..S. Dichiara et al, 2017, The Astrophysical Journal, 848, article id L12, “Multi-messenger Observations of a Binary Neutron Star Merger”
- Alfaro, R.; Alvarez, C.; Arceo, R.; , ..S. Dichiara et al, 2018, Physical Review D, submitted, “All-particle cosmic ray energy spectrum measured by the HAWC experiment from 10 to 500 TeV”

Conference Proceedings:

- S. Dichiara, M. M. González, N. Fraija, I. Torres, A. D. Becerril, R. Alfaro and D. Lennarz for the HAWC collaboration, “Search of extended or delayed TeV emission from GRBs with HAWC”, PoS(ICRC2017)620, Proceedings of the 35th International Cosmic Ray Conference (ICRC2017)
- S. Dichiara, M. M. González, N. Fraija, for the HAWC collaboration, “Constraints on microphysical parameters of GRBs using HAWC”, PoS(IFS2017)068, Proceedings of the 7th Fermi Symposium (IFS2017)

Gasparyan Sargis

Position: PhD student
Period covered: 2016 - 2019



I Scientific Work

Active Galactic Nuclei (AGNs): Modeling and Theoretical interpretation

II Conferences and educational activities

II a Conferences and Other External Scientific Work

- High-Energy Phenomena in Relativistic Outflows VI (HEPRO 6), 2017 September 11-15, Moscow, Russia

2017 List of Publication

- N. Sahakyan and S. Gasparyan, High Energy Gamma-Ray Emission From PKS 1441+25, Monthly Notices of the Royal Astronomical Society.
- D. Zargaryan, S. Gasparyan, V. Baghmanyan and N. Sahakyan, Comparing 3C 120 jet emission at small and large scales, Astronomy & Astrophysics.
- V. Baghmanyan, S. Gasparyan and N. Sahakyan, Rapid Gamma-Ray Variability of NGC 1275, The Astrophysical Journal.
- Ulisses Barres de Almeida , Bernardo M. O. Fraga , Paolo Giommi , Narek Sahakyan , Sargis Gasparyan and Carlos H. Brandt, Long-Term Multi-Band and Polarimetric View of Mkn 421: Motivations for an Integrated Open-Data Platform for Blazar Optical Polarimetry, MDPI-galaxies.

Curriculum vitae et studiorum: ROBERTO GUIDA

ICRA - International Center for Relativistic Astrophysics,
Department of Physics,
University of Rome “La Sapienza”,
Piazzale Aldo Moro 5,
00185 Roma.
Telephone: (0039) 0649914397.
Fax: (0039) 064454992.
E-mail: roberto.guida@icra.it.

PERSONAL DATA:

Date and place of birth: April 28th 1979, Rome, Italy.
Citizenship: Italian.
Home address: Piazzale Roberto Ardigò 38, 00142 Roma.
Home telephone: (0039) 06 5941678.
Mobile telephone: (0039) 3382427338.

EDUCATION:

November 2004 (3 years)	<i>Department of Physics and ICRA (International Center for Relativistic Astrophysics), University of Rome “La Sapienza”.</i> Admitted to the International Relativistic Astrophysics Ph.D. Program (IRAP PhD) granted with a fellowship by the six participating institutions: ETH Zurich, Freie Universität Berlin, Observatoire de la Côte d’Azur, Université de Nice-Sophia Antipolis, Università di Roma “La Sapienza”, Université de Savoie, http://www.icra.it/IRAPPhD/ .
September 2004	<i>Department of Physics, University of Rome “La Sapienza”.</i> Master Degree (Laurea) in Physics, grade: 109/110, Master Thesis’s Advisor: Prof. R. Ruffini . Fractality and cosmological initial condition: the role of the velocity field.
July 1998	<i>Scientific High School “Primo Levi” in Rome.</i> Scientific high school diploma, grade: 47/60.

RESEARCH INTERESTS:

- High energy astrophysics
- Gamma ray burst (GRB): both theoretical aspects and data analysis.
- General relativity; theoretical and observational cosmology.

COMPUTER SKILLS:

Operating systems: Windows (very good), Linux (many distributions, very good), Unix True64 (fair).
Typesetting and Presentations: L^AT_EX(very good), Open Office (very good), Microsoft Office (very good).
Data analysis: Gnuplot (very good), SAS (XMM-Newton Science Analysis System) (some exposure), Grace (some exposure), SAOImage DS9 (some exposure), HEAsoft (fair, good with the SWIFT BAT and XRT data reduction), ESO-MIDAS (some exposure), some exposure in data reduction of INTEGRAL data and GLAST simulated data (some exposure also with GALPROP).
Computational task: Mathematica (good), Fortran (some exposure).
Programming: Java (some exposure), LabView (fair), Bash scripting (fair).

LANGUAGES:

Italian: Native language.
English: Fluent.
Portuguese: Fair.
Spanish: Reading and listening comprehension; basic conversation.
French: Reading comprehension.
Swedish: Listening comprehension.

PUBLICATIONS IN REFEREED JOURNALS:

- Bernardini M. G., Bianco C. L., Caito L., Dainotti M. G., Guida R., Ruffini R., “GRB970228 and a class of GRBs with an initial spikelike emission”, **Astron. & Astrophys.** **474**, **L13**, **2007**.
- Dainotti M. G., Bernardini M. G., Bianco C. L., Caito L., Guida R., Ruffini R., “GRB060218 and GRBs associated to Supernovae Ib/c”, **Astron. & Astrophys.**, **471**, **L29**, **2007**.
- Ruffini R., Bernardini M. G., Bianco C. L., Chardonnet P., Frascchetti F., Guida R., Xue S. S., “GRB 050315: A step toward Understanding the Uniqueness of the Overall Gamma-Ray Burst structure”, **The Astrophysical Journal**, **645**, **L109**, **2006**.
- Ruffini R., Bernardini M. G., Bianco C. L., Chardonnet P., Frascchetti F., Guida R., Xue S. S., “GRB 050315: A step toward the uniqueness of the overall GRB structure and the true nature of long GRBs”, **Nuovo Cimento**, **121B**, **1367**, **2006**.
- Bernardini M. G., Bianco C. L., Caito L., Chardonnet P., Corsi A., Dainotti M. G., Frascchetti F., Guida R., Ruffini R., Xue S. S., “GRB970228 as a prototype for short GRBs with afterglow”, **Nuovo Cimento**, **121B**, **1439**, **2006**.
- Guida R., Lattanzi M., Ruffini R., “Emergence of self similar properties in the evolution of density perturbations”, **Journal of the Korean Physical Society**, **49**, No. **2**, **797**, **2006**.

PROCEEDINGS:

- Guida R., Bernardini M. G., Bianco C. L., Caito L., Dainotti M. G., Ruffini R., “An Amati-like spectral energy theoretical correlation”, in the Proceedings of “10th Italian-Korean Symposium on Relativistic Astrophysics” in Pescara, Italy, June 25-30, 2007, in press.
- Bernardini M. G., Bianco C. L., Caito L., Dainotti M. G., Guida R., Ruffini R., “GRB970228 as the prototype of a new GRBs class”, in the Proceedings of “10th Italian-Korean Symposium on Relativistic Astrophysics” in Pescara, Italy, June 25-30, 2007, in press.
- Bianco C. L., Bernardini M. G., Caito L., Dainotti M. G., Guida R., Ruffini R., “The “canonical” GRB scenario”, in the Proceedings of “10th Italian-Korean Symposium on Relativistic Astrophysics” in Pescara, Italy, June 25-30, 2007, in press.
- Caito L., Bernardini M. G., Bianco C. L., Dainotti M. G., Guida R., Ruffini R., “GRB 060614: an unusual burst?”, in the Proceedings of “10th Italian-Korean Symposium on Relativistic Astrophysics” in Pescara, Italy, June 25-30, 2007, in press.

- Dainotti M. G., Bernardini M. G., Bianco C. L., Caito L., Guida R., Ruffini R., “GRB060218 and GRBs associated with Supernovae Ib/c”, in the Proceedings of “10th Italian-Korean Symposium on Relativistic Astrophysics” in Pescara, Italy, June 25-30, 2007, in press.
- Guida R., Bernardini M. G., Bianco C. L., Caito L., Dainotti M. G., Ruffini R., “The Amati relation within the fireshell model”, in the Proceedings of “4th Italian-Sino Workshop on Relativistic Astrophysics” in Pescara, Italy, July 20-30, 2007, in press.
- Bernardini M. G., Bianco C. L., Caito L., Dainotti M. G., Guida R., Ruffini R., “GRB970228 and the class of GRBs with an initial spikelike emission: do they fulfill the Amati relation?”, in the Proceedings of “4th Italian-Sino Workshop on Relativistic Astrophysics” in Pescara, Italy, July 20-30, 2007, in press.
- Bianco C. L., Bernardini M. G., Caito L., Dainotti M. G., Guida R., Ruffini R., “The “fireshell” model and the “canonical” GRB scenario”, in the Proceedings of “4th Italian-Sino Workshop on Relativistic Astrophysics” in Pescara, Italy, July 20-30, 2007, in press.
- Caito L., Bernardini M. G., Bianco C. L., Dainotti M. G., Guida R., Ruffini R., “GRB 060614: a progress report”, in the Proceedings of “4th Italian-Sino Workshop on Relativistic Astrophysics” in Pescara, Italy, July 20-30, 2007, in press.
- Dainotti M. G., Bernardini M. G., Bianco C. L., Caito L., Guida R., Ruffini R., “On GRB060218 and binaries as progenitors of GRB-SN systems”, in the Proceedings of “4th Italian-Sino Workshop on Relativistic Astrophysics” in Pescara, Italy, July 20-30, 2007, in press.
- Ruffini R., Bernardini M. G., Bianco C. L., Caito L., Chardonnet P., Dainotti M. G., Frascchetti F., Guida R., Rotondo M., Vereshchagin G., Vitagliano L., Xue S. S., “The Blackholic energy and the canonical Gamma-Ray Burst”, in the Proceedings of “XII Brazilian School of Cosmology and Gravitation” in Mangaratiba, Brazil, September 10-23, 2006, **AIP Conference Proceedings, 910, 55, 2007.**
- Guida R., Bernardini M. G., Bianco C. L., Caito L., Chardonnet P., Dainotti M. G., Frascchetti F., Ruffini R., Xue S. S., “Theoretical interpretation of GRB060124”, in the Proceedings of “XI Marcel Grossmann meeting on General Relativity” in Berlin, Germany, July 23-29, 2006, in press.
- Ruffini R., Bernardini M. G., Bianco C. L., Chardonnet P., Frascchetti F., Guida R., Xue S. S., “GRB050315: A step in the proof of the uniqueness of the overall GRB structure”, in the Proceedings of “16th Annual October Astrophysics Conference in Maryland: Gamma-Ray Burst in the SWIFT era” in Washington DC, USA, November 29 - December 2, 2005, **AIP Conference Proceedings, 836, 103, 2006.**
- Ruffini R., Bernardini M. G., Bianco C. L., Chardonnet P., Frascchetti F., Guida R., Xue S. S., “The crucial role of GRB 050315 for the verification of the GRB structure”, in the Proceedings of “36th COSPAR Scientific Assembly” in Beijing, China, July 16-23, 2006, **Cosp., 36, 2331R, 2006.**
- Ruffini R., Bernardini M. G., Bianco C. L., Caito L., Chardonnet P., Dainotti M. G., Frascchetti F., Guida R., Vereshchagin G., Xue S. S., “The role of GRB 031203 in clarifying the astrophysical GRB scenario”, in the Proceedings of “6th INTEGRAL Workshop - The Obscured Universe” in Moscow, Russia, July 2-8, 2006, **ESA Special Publication, SP-622, arxiv:0705.2456**, in press.
- Cacciani A., Guida R., “Observation of the atmospheric Sodium layer with a Magneto-Optical-Filter (MOF)”, on the Proceedings of “55th International Astronautical Congress (IAC)” in Vancouver, Canada, October 4-8, 2004, **arxiv:physics/0504108.**

TEACHING EXPERIENCE:

- | | |
|--------------|--|
| May 2007 | <i>Department of Physics, University of Rome “La Sapienza”.</i>
Degree Commission Board member (master thesis Supervisor’s Assistant). |
| October 2005 | <i>Department of Chemistry and Pharmacology, University of Rome “La Sapienza”.</i>
Collaboration grant from the Physics Department of the University of Rome “La Sapienza” as Teaching Assistant for the Physics Lectures class (60 hours) at the Chemistry and Pharmacology Degree course from November 2005 to June 2006. |

Ph.D. SCHOOL ATTENDED:

- September 2007 “Scuola Nazionale di Astrofisica IX ciclo”, Venezia (Italy), September 16-22, 2007, <http://www.merate.mi.astro.it/scuolasanservolo2007>
- December 2006 “General Relativity trimester: Gravitational Waves, Relativistic Astrophysics and Cosmology”, Paris (France), November 28 - December 7, 2006, <http://luth2.obspm.fr/IHP06>.
- September 2006 “XII Brazilian School of Gravitation and Cosmology”, Mangaratiba (Brazil), September 10-23, 2006, <http://www.cbpf.br/~cosmogra/bscgxxii.htm>.
- July 2006 “Astrofisica Gamma e Multifrequenza: Analisi Dati e Problematiche Astroparticellari”, Perugia (Italy), July 3-7, 2006, <http://glastweb.pg.infn.it/school2006/index.htm>.
- February 2006 “1st Bego Scientific Rencontre”, Nice (France), February, 6-17, 2006. <http://www.icra.it/IRAPPhD/Bego/First/Welcome.htm>.
- September 2005 “2nd IRAP PhD Summer School”, Pescara (Italy), September 5-15, 2005.
- August 2005 “Gamma-ray bursts: the first three hours”: Santorini summer school on gamma-ray bursts, sponsored by: European Research Training Network (RTN) on “GRBs: An Enigma and a Tool”, Santorini (Greece), August 29 - September 2, 2005, <http://gammaray.nsstc.nasa.gov/~santorini/>.

CONTRIBUTED TALKS:

- July 2007 “The fireshell model and the Amati relation”, presented at the “4th Italian-Sino Workshop on Relativistic Astrophysics”, Pescara (Italy), July 20-30, 2007, http://www.icra.it/Italian-Sino_Workshop/fourth/english/welcome.htm.
- June 2007 “The Amati relation in our canonical GRB scenario”, presented at the “10th Italian-Korean Symposium on Relativistic Astrophysics”, Pescara (Italy), June 25-30, 2007, <http://www.icra.it/ITKO/10/welcome.htm>.
- April 2007 “The Amati relation in the dyadosphere model”, presented at the “The April Meeting 2007 of the American Physical Society”, Jacksonville (Florida), April 14-17, 2007, <http://www.aps.org/meetings/april/index.cfm>.
- February 2007 “Theoretical interpretation of the Amati relation”, presented at the “I Cesare Lattes meeting on Gamma-Ray Bursts, Black Holes and Supernovae”, Mangaratiba (Brazil), February 25 - March 3, 2007, http://www.icra.it/ICRA_Networkshops/lattes_meeting/first/welcome.htm.
- September 2006 “The effective 3D structure of the ISM in interpreting the gamma emission of GRB 060124”, presented at “XII Brazilian School of Gravitation and Cosmology”, Mangaratiba (Brazil), September 10-23, 2006, <http://www.cbpf.br/~cosmogra/arquivos/princbscg.htm>.
- July 2006 “Theoretical interpretation of GRB 060124”, presented at “XI Marcel Grossmann Meeting on General Relativity”, Berlin (Germany), July 23-29, 2006, <http://www.icra.it/mg/mg11/welcome.htm>.

July 2005 “Emergence of self similar properties in the evolution of density perturbations”, presented at “IX Italian-Korean Symposium on Relativistic Astrophysics”, Seoul (South Korea) - Mt. Kumgang (North Korea), July 19-24, 2005.

RESEARCH EXPERIENCE:

- 2005 - Present *IRAP Ph.D. Program.*
- Possible applications of GRBs in cosmology: an Amati-like spectral-energy correlation within the theoretical fireshell model for GRBs.
- Theoretical analysis of the temporal and spectral properties of GRB050315, GRB060218, GRB060614, GRB061007 and GRB050509b within the fireshell model, showing perfect agreement between the observations and the theoretical simulations.
- Reduction, calibration and spectral analysis of the row data of GRB060614 from the BAT instrument on board SWIFT satellite, using the standard analysis software distributed within FTOOLS.
- Attended the following courses among the ones approved by the faculty: “Relativistic cosmology and beyond” by Dr. G. Montani, “Selected topics in statistical mechanics theories” by Prof. A. Pelster, “Covariant kinetic theory” by Prof. J.Ehlers, “Selected topics in relativistic quantum field theories” by Prof. H. Kleinert, “Selected topics in cosmology” by Prof. F. Steiner.
-
- November 2007 *Gamma-Ray Burst 2007, Santa Fe, New Mexico (USA).*
- Attended the “GRB 2007” meeting with three poster presentations on “Short and canonical GRBs”, “GRB060614: a progress report” and “Theoretical interpretation of the Amati relation within the fireshell model”. Presented each poster at the “gong-session”.
-
- October 2005 *IAC (International Astronautical Congress), Fukuoka, Japan.*
- Accepted at the “56th International Astronautical Federation Congress (IAC)” for a poster presentation on “Detecting Earth’s free oscillations through the observation of the atmospheric Sodium layer”, <http://iaf.zarm.uni-bremen.de/abstractcd/2005/>.
-
- October 2004 *IAC (International Astronautical Congress), Vancouver, Canada.*
- Attended the “55th International Astronautical Federation Congress (IAC)” with a poster presentation on “Observation of the atmospheric Sodium layer with a Magneto-Optical Filter (MOF)”, with a partial sponsorship by ESA (European Space Agency), <http://iaf.zarm.uni-bremen.de/abstractcd/2004/>.
-
- 2004 *Undergraduate student: Department of Physics, University of Rome.*
- Advisor: Prof. R.Ruffini.
- Analytical study of the dynamical stability of the spherically symmetric collapse of a self-gravitating gas cloud; hydrodynamical description of the fragmentation process and of the transition from homogeneity to fractality in the gravitational collapse; development of a structure formation theoretical model for the fractal structure of the Universe.

- 2003 - 2004 *Undergraduate student: Department of Physics, University of Rome, Spectroscopy and Solar Physics Laboratory.*
Supervisors: Prof. P. de Bernardis, prof. A. Cacciani.
Photometric asteroseismology on a Rapid Oscillating star: determination of the main vibration mode's frequency using a new photometric method. Carried out the CCD and the photometers calibration, performed the observations by telescope and using a Lock-In amplifier, and developed the software for image and data analysis:
<http://www.icra.it/People/Guida/Sito%20G28/laboratorio.htm> (only italian).
Supervisor: Prof. A. Cacciani.
Studies of the use of the Magneto-Optical-Filter (MOF) from the space,
<http://www.icra.it/People/Guida/Sito%20G28/MOF.htm>.
- August 2003 *ESA (European Space Agency) - EAC (European Astronaut Center), Cologne, Germany.*
Attended the final phase of the "SUCCESS Student Contest" and the "ISS Education Fund Launch Event", sponsored by ESA (European Space Agency).
- November 2002 *ESA (European Space Agency) - ESTEC (European Space Research and Technology Centre), Noordwijk, the Netherlands.*
Passed the first phase of the "SUCCESS Student Contest" (a competition for European university students from all disciplines to propose an experiment that can be conducted on board the International Space Station (ISS)), with the proposal: "Observation of the atmospheric sodium layer at 90 Km in the Mesosphere from the ISS",
http://www.icra.it/People/Guida/Sito%20G28/Earth_Atmosphere.htm, with the collaboration of "JPL laboratory" (Pasadena) for the construction of the image sensor and with a planned collaboration with the Earth-shine project at the "Big Bear Solar Observatory" (Big Bear Lake, California).
- May 2002 *Undergraduate student: Didactic exhibition "An Introduction to Relativistic Astrophysics", sponsored by "Ufficio Scolastico Regionale per l'Abruzzo", made for the students in the first academic year of their scientific degree.*
My paper on the black holes: "The black hole's irreducible mass and its energetic efficiency" was accepted for a presentation,
<http://www.icra.it/solar/sigismondi/remo60.html> (only italian).
- 2001 - 2002 *Undergraduate student: Department of Physics, University of Rome, Nuclear Physics Laboratory.*
Supervisor: Prof. A. di Domenico
Carried out the construction and the calibration of an electronic device to perform measures of the β decay on radioactive sources, in order to estimate the electron mass.

MEETINGS AND WORKSHOPS ATTENDED:

- 2004 - Present Monthly seminars on high energy astrophysics, cosmology and general relativity held at University of Rome "La Sapienza".
- November 2007 "GRB 2007", Santa Fe (New Mexico, USA), November 5-9, 2007, <http://grb2007.lanl.gov/>.
- July 2007 "4th Italian-Sino Workshop on Relativistic Astrophysics", Pescara (Italy), July 20-30, 2007, http://www.icra.it/Italian-Sino_Workshop/fourth/english/welcome.htm.

June 2007	“10th Italian-Korean Symposium on Relativistic Astrophysics, Pescara, (Italy), June 25-30, 2007, http://www.icra.it/ITKO/10/welcome.htm .
April 2007	“The April Meeting 2007 of the American Physical Society”, Jacksonville (Florida), April 14-17, 2007, http://www.aps.org/meetings/april/index.cfm .
February 2007	“I Cesare Lattes meeting on Gamma-Ray Bursts, Black Holes and Supernovae”, Mangaratiba (Brazil), February 25 - March 3, 2007, http://www.icra.it/ICRA_Networkshops/lattes_meeting/first/welcome.htm .
December 2006	“SWIFT birthday”, Merate (Italy), November 29 - December 1, 2006.
June 2006	“6 th Science Analysis System (SAS) Workshop”, ESA’s European Space Astronomy Center (ESAC), San Lorenzo de El Escorial (Spain), May 30 - June 2, 2006, http://xmm.esac.esa.int/external/xmm_science/workshops/sas6/ .
March 2006	“Workshop sull’Analisi Dati di GRB con Swift”, Trieste (Italy), March 24, 2006, http://www.ts.infn.it/attivita/eventi/SDA_2006 .
July 2005	“IX Italian-Korean Symposium on Relativistic Astrophysics”, Seoul (South Korea)-Mt. Kumgang (North Korea), July 19-24, 2005.
June 2005	“5 th Science Analysis System (SAS) Workshop”, ESA’s European Space Astronomy Center (ESAC), San Lorenzo de El Escorial (Spain), June 7-10, 2005, http://xmm.vilspa.esa.es/external/xmm_user_support/sas_workshop5/ .
June 2005	“2nd Italian-Sino Workshop on Cosmology and Relativistic Astrophysics: Probing the Dark Universe”, Pescara (Italy), June 11-20, 2005, http://www.icra.it/icra_networkshops/ .
June 2005	“The Russian-Italian Lifshitz-Zeldovich Meeting on Relativistic Astrophysics”, June 27-July 3, 2005.
February 2005	5 th AGILE Science Workshop “The galactic center and other cosmic accelerators”, CNR, Rome (Italy), February 2, 2005.
January 2005	“The SWIFT day”, Monte Porzio Catone Astronomical Observatory, Roma (Italy), January 12, 2005, http://www.mporzio.astro.it/HEAG/ .
October 2004	“55 th International Astronautical Federation Congress (IAC)”, Vancouver (Canada), October 4-8, 2004.
September 2004	“Testing the Equivalence Principle in space and on ground”, Pescara (Italy), September 20-23, 2004, http://www.icra.it/icra_networkshops/ .
July 2004	“1 st Italian-Sino Workshop on Cosmology and Relativistic Astrophysics”, Roma-Pescara (Italy), July 7-17, 2004, http://www.icra.it/Italian-Sino_Workshop/First/Welcome.htm .
August 2003	“VIII Italian-Korean Symposium on Relativistic Astrophysics”, Pescara (Italy), August 18-23, 2003, http://www.icra.it/icra_networkshops/ .
November 2002	“SUCCESS Student Contest”, ESA’s European Space Research and Technology Centre (ESTEC), Noordwijk (the Netherlands), November 2-9, 2002.

PROFESSIONAL MEMBERSHIPS:

Member of the American Physical Society (APS).

Member of the International Center for Relativistic Astrophysics (ICRA).

Member of the International Network of the Centers for Relativistic Astrophysics (ICRAnet).

Member of the Italian Society of Physics (SIF).

OTHER ACTIVITIES:

Mathematics and physics private lessons for high school and first academic year students.

Swimming-pool lifeguard, swimming teacher (given by (FIN) Italian Swimming Federation).

Nautical sailing (without any distance limits from the coast) license.

SPORTS & HOBBIES:

Surfing, snowboarding, swimming, Brazilian music (cavaquinho, violão and tamborim), traveling, linux and foreign languages.

Email: wbhan@shao.ac.cn

Homepage: <http://www.gettao.com/>

Name: Wen-biao Han

Sex: Male

Age: 28

Nationality: China P. R.

Experience:

09/1998-07/2002, Physics department of Anhui Normal University, Bachelor
09/2004- , Shanghai Astronomical Observatory, PhD student

Research Direction:

Numerical algorithms,
Relativity celestial mechanics,
Numerical relativity

Publications:

1. Revised research about chaotic dynamics in Manko et al. spacetime,
Wen-biao Han, **Phys. Rev. D**, 77, 123007 (2008)
2. Chaos and Dynamics of spinning particles in Kerr spacetime,
Wenbiao Han, **Gen. Rel. & Grav**, 40, 1831-1847 (2008)
3. Dynamics of particles in slowly rotating black holes with dipolar halos,
W.B. Han, **Proceeding of IAU Symposium**, 3, 498 (2007)
4. The Adjustment-stabilization Method for constrained systems, Wen-biao Han,
Xin-hao Liao, **Computer Physics Communications**, 117, 500-505 (2007)
5. Gravitational waves from test particles around black holes immersed in a strong
magnetic field, Wen-biao Han, **Inter. J. Theor. Phys.**, published online (2008)

Haney Maria

Position: IRAP Ph.D. student

Period covered: 01/2013 – 10/2013



I Scientific Work

For my doctoral research I have mainly focussed on massive particles and fields in the background of exact gravitational wave spacetimes. With Donato Bini and his collaborators I have worked on projects related to this field of research, including:

- the propagation of electromagnetic waves in exact gravitational wave spacetimes,
- the response of an interferometric gravitational wave detector beyond the linear approximation of general relativity,
- the scattering of massive particles by electromagnetic and gravitational wave radiation fields in the framework of GR,
- the description of such radiation fields as an equivalent optically active medium with an analysis of the associated optical properties.

In our most recent work we have studied light propagation in colliding gravitational wave spacetimes, applying the optical medium analogy to these backgrounds. In view of the complexity of the non-linear interaction of the two waves, the optical medium analogy proves helpful in describing some interesting effects concerning the analysis of the refraction index and the propagation of light rays in the different spacetime regions.

I have successfully defended the thesis summarising my doctoral research on October 22nd, 2013.

II Conferences and educational activities

II a Conferences and Other External Scientific Work

talk @ the 2013 yearly ICRANet Scientific Meeting on Relativistic Astrophysics (June 3-21, Pescara, Italy)

II b Work With Students

II c Diploma thesis supervision

II d Other Teaching Duties

II e. Work With Postdocs

III. Service activities

III a. Within ICRANet

III b. Outside ICRANet

IV. Other

2013 List of Publication

D. Bini, P. Fortini, A. Geralico, M. Haney and A. Ortolan, *Light scattering by radiation fields: the optical medium analogy*, EPL **102**, 20006, (2013)

D. Bini, A. Geralico and M. Haney, *Refraction index analysis of light propagation in a colliding gravitational wave spacetime*, accepted for publication by Gen. Rel. Grav., (2013)

D. Bini, A. Geralico, M. Haney and A. Ortolan, *Strong field effects induced by electromagnetic waves*, in preparation, (2013)

Harutyunyan Vahagn



Position: **PhD**

Period covered: 2013-2016

I Scientific Work

Main Field: Extragalactic Astronomy

My current research is dedicated of measuring SN rate as a function of environment and radio luminosity of the galaxies. I exploit data from SUDARE (Supernova Diversity And Rate Evolution) survey, which is conducted at the ESO VST telescope with the aim to measure rates of different SN type in $0 < z < 0.8$ redshift range. For this task the study being performed on two best-studded extragalactic fields, CDFS and COSMOS.

II Conferences and educational activities

II a Conferences and Other External Scientific Work

II b Work With Students

II c Diploma thesis supervision

Supervisor: Massimo Della Valle

Thesis: Supernova Diversity As a Function of Galaxy Radio and Infrared Power: Rates and Hints on Supernova Progenitors

II d Other Teaching Duties

II e. Work With Postdocs

III. Service activities

III a. Within ICRANet

Research: We aim to analyze if at higher redshifts both type Ia and CC SN rates follow the same trend that of the local Universe. For this purpose we cross-matched the galaxy sample monitored by SUDARE with VLA catalog. The Supernova Diversity And Rate Evolution (SUDARE) is a SN survey that aims to measure the SN rates as a function of redshift, sSFR, stellar mass and radio and infrared luminosity of galaxies. The SN search is performed in two of the best-studied extragalactic fields, the CDFS and COSMOS. The cadence of observation, during the first two years of our

program, is every 3 days in r band and 1 week in g, i bands to obtain multicolor light curves for photometric typing of transients. We collected 117 SNe, from which 57% are type Ia SNe To analyze if the SN rates also increase with infrared luminosity we cross-matched the SUDARE galaxy sample with MIR SWIRE catalog. In the LIRG subsample 8 SNe have been discovered. The SN Ia and CC rate measurement in radio and infrared galaxy samples is in preparation.

III b. Outside ICRANet

IV. Other

2016 List of Publication

1. M.T. Botticella et al., Supernova rates from the *SUDARE* VST-OmegaCam search
II. Rates in a galaxy sample. Accepted for publication in *Astronomy & Astrophysics*
2. V. Harutyunyan et al., Supernova rates as a function of galaxy radio and infrared power from *SUDARE* Survey (*in preparation*)

Izzo Luca

Position: Junior Staff
Period covered: 2013 - 2016



I Scientific Work

- Data reduction and Analysis of Gamma-Ray bursts observed by Swift and Fermi
- Support for the Swift-XRT team (one week per month on-duty for the monitor of GRBs observed by Swift)
- Analysis of nova phenomena in outbursts
- Cosmology with GRBs

II Conferences and educational activities

II a Conferences and Other External Scientific Work

- Swift – 10 years of discovery - Rome, 2-5 December 2014
- 2nd Cesar-Lattes meeting – Rio de Janeiro, 11-19 April 2015
- XIV Marcel Grossmann on General Relativity – Rome, 12-18 July 2015
- The Golden Age of Cataclysmic Variables and Related Objects III – Palermo, 7-12 September 2015
- IX Congresso Nazionale Oggetti Compatti – Rome, 22-25 September 2015

II b Work With Students

- 1) Induced gravitational collapse in the BATSE era: The case of GRB 970828, Astronomy Reports (2015) – students: Cristina Barbarino, Maxime Enderli, Yu Wang
- 2) On binary driven hypernovae and their nested late X-ray emission, Astronomy Reports (2015) - students: Cristina Barbarino, Maxime Enderli, Yu Wang, Milos Kovacevic

II c Diploma thesis supervision

II d Other Teaching Duties

Main lecturer and organizer of the "1st ICRANet Lecture Series for PhD students", University of Rome Sapienza, Italy.

II e. Work With Postdocs

- 1) New measurements of Ω_m with gamma-ray bursts, A&A (2015) – postdocs: Marco Muccino and Elena Zaninoni
- 2) Induced gravitational collapse in the BATSE era: The case of GRB 970828, Astronomy Reports (2015) – postdocs: Marco Muccino, Giovanni Battista Pisani, Carlo Luciano Bianco, Jorge Rueda

3) On binary driven hypernovae and their nested late X-ray emission, Astronomy Reports (2015) - postdocs: Marco Muccino, Giovanni Battista Pisani, Carlo Luciano Bianco, Jorge Rueda

III. Service activities [*activities carried out in collaboration with ICRANet (e.g. teaching activities, conferences etc...) and outside ICRANet (teaching activities in your university etc...)*]

III a. Within ICRANet

Main lecturer and organizer of the "1st ICRANet Lecture Series for PhD students", University of Rome Sapienza, Italy.

III b. Outside ICRANet

Support for the Swift-XRT team (one week per month on-duty for the monitor of GRBs observed by Swift)

IV. Other

Seminar held at

- Pontificia Università Católica de Chile, Santiago – January 2015

- Istituto Superior Tecnico, Lisbona – November 2015

- Osservatorio Astronomico di Capodimonte – November 2015

2015 List of Publication

Refereed

-L. Izzo; M. Muccino; E. Zaninoni; L. Amati; M. Della Valle; “New measurements of Ω_m from gamma-ray bursts”, A&A accepted for publication, (2015), Astron & Astroph., 582, 115, (2015), arXiv:1508.05898

-L. Izzo; M. Della Valle; E. Mason; F. Matteucci; D. Romano; L. Pasquini; L. Vanzì; A. Jordan; J. M. Fernandez; P. Bluhm; R. Brahm; N. Espinoza; R. Williams; “Early Optical Spectra of Nova V1369 Cen Show the Presence of Lithium”, Astroph. Journal Letters, 808, 14, (2015), arXiv:1506.08048

-J. M. Diego; T. Broadhurst; N. Benitez; K. Umetsu; D. Coe; I. Sendra; M. Sereno; L. Izzo; G. Covone; “A free-form lensing grid solution for A1689 with new multiple images”, MNRAS, 446, 683, (2015), arXiv:1402.4170

-S. Cao; G. Covone; E. Jullo; J. Richard; L. Izzo, Luca; Z. H. Zhu; “Source-plane Reconstruction of the Giant Gravitational Arc in A2667: A Candidate Wolf-Rayet Galaxy at $z \sim 1$ ”, Astron. Journal, 149, 3, (2015), arXiv:1410.6594

-L. Amati; et al.; “Probing the emission physics and weak/soft population of Gamma-Ray Bursts with LOFT”, White Paper in Support of the Mission Concept of the Large Observatory for X-ray Timing, arXiv:1501.02771, (2015)

-R. Ruffini; L. Izzo; C.L. Bianco; J.A. Rueda; C. Barbarino; H. Dereli; M. Enderli; M. Muccino; A.V. Penacchioni; G.B. Pisani; Y. Wang; “Induced gravitational collapse in the BATSE era: The case of GRB 970828”, Astronomy Rep., 59, 626, (2015)

-M. Muccino; R. Ruffini; C.L. Bianco; M. Enderli; M. Kovacevic; L. Izzo; A.V. Penacchioni; G.B. Pisani; J.A. Rueda; Y. Wang; “On binary driven hypernovae and their nested late X-ray emission”, *Astronomy Rep.*, 59, 581, (2015).

Name: KANAAN Chadia

Position : PhD student

Period covered: 01/12/2007 - 01/12/2009



Initially Lebanese, I was born in Byblos in 1983. I received my Bachelor in physics from the Lebanese University in 2005. In the same year, I moved to France to pursue high studies and received my Master in physics “Cosmos, fields and particles” from the University of Montpellier beginning of summer 2007. On December 1st, I was enrolled to the IRAP as a PhD student in Relativistic Astrophysics under a specific collaboration between the University of Nice Sophia Antipolis (Mother institution) and the University of Rome La Sapienza.

My past research work has covered various areas in Astrophysics and theoretical cosmology, namely , warm hot Intergalactic Medium WHIM, non standard cosmologies such as $f(r)$ gravity , and a non-standard thermal evolution of CMB.

Presently, I am investigating the use of gamma-ray burst as standard candles in cosmology: The spectral properties of GRB shows great complexity and prove, beyond doubt, that GRB are all but standard candles. The occurrence of many correlations between GRB observable leave the hope of standardizing these extremely energetic objects in a way to link spectral properties to cosmological redshift and distance modulus, leading to a Hubble diagram analogous to the one constructed for SNIa. Almost, among the many correlations proposed, one is tight enough to be counted as “possible” intrinsic property of GRBs, namely the “Amati relation”.

Recently, due to the swift early data release , many studies shows a strong truncation between the Amati relation and the detector threshold, a fact that seems potential but far to be confirmed with the very complicated triggering system of BAT detector. Upcoming generation of satellite (Agile, Glast, ...) should be able to firmly confirm/affirm this fact.

Till then, the most surely way to proceed analysis is by Monte Carlo simulation of observable quantities and check if already the Amati relation is solid and real enough as to lead to a standard GRB. This work is still ongoing .

Apart scientific research, The educational activities can be summarized by a conference and a summer school. The first conference I had took place in kolkata (India) between the 10th and 17th of February 2008. It was entitled “Observational evidence for black holes in the universe & SNBCBS-ICRANET Joint Satellite Meeting on Black holes, Neutrons stars and gamma ray bursts”. I have have also participated , on July the fifth, to the “ 2nd Course of the International School Relativistic Astrophysics “John Archibald Wheeler” on “Frontiers in Numerical Gravitational Astrophysics”.

CURRICULUM VITAE

Surname: Khachatryan

Name: Harutyun

Address: Republic of Armenia, Yerevan, A. Khachatryan 1, apt 1

Date of birth: 10 June 1981

Experience

1998-2004 Yerevan State University, Physics Department

Physicist-theorist, Master degree

2005- IRAP PhD student

2006 - researcher, Dept. Theoretical Physics, Yerevan Physics Institute

Research objectives

Cosmology (CMB and dark energy).

Publications

1. D. B. Saakian, Chin-Kun Hu and H.G.Khachatryan, Solvable biological models with general fitness functions and multiple mutations in parallel mutation-selection scheme, Phys. Rev. E 70, 041908 (2004),

2. H.G. Khachatryan, Invariants and solutions of Gurzadyan-Xue dark energy cosmological models, Mod. Phys. Let. A **22** (2007).

3. H.G. Khachatryan, G.V. Vereshchagin, G. Yegorian, Luminosity distance in GX cosmological models, Il Nuovo Cimento B 122, 197 (2007).

4. H. J. M. Cuesta, H. Dumet M., C. Furlanetto, H. G. Khachatryan, S. Mirzoyan and G. Yegorian, Hubble Diagram of Gamma-Rays Bursts calibrated with GX Cosmology, astro-ph/0707.1297.

5. V.G.Gurzadyan, A.A.Starobinsky, A.L.Kashin, H.Khachatryan, G.Yegorian, On Axial and Plane--Mirror Inhomogeneities in the WMAP3 Cosmic Microwave Background Maps, arXiv:0709.0886.

Lecian Orchidea Maria

Period covered: 2017

Position:

- Researcher, 1 September 2017- ongoing, Comenius University in Bratislava, Faculty of Mathematics, Physics and Informatics, KTFDF -Department of Theoretical Physics and Physics Education, Bratislava, Slovakia, SAIA (Slovak Academic Information Agency), National Scholarship Programme of the Slovak Republic (NS'P).
- Full Professor, Physics, Academic Year 2017-2018, DICEA- Department of Civil, Constructional and Environmental Engineering, Sapienza University of Rome, Rome, Italy.
- Professor Assistant, Geometry, Referent Professor: Prof. P. Maroscia, Academic Year 2016-2017, DIAEE- Department for Astronautics Engineering, Electrical and Energetics, Sapienza University of Rome, Rome, Italy
- Professor Assistant, Fundamentals of Physics II, Referent Professor: Prof. S. Atzeni, Academic Year 2016-2017, DIAEE- Department for Astronautics Engineering, Electrical and Energetics, Sapienza University of Rome, Rome, Italy.



I Scientific Work

Theoretical Physics

General Relativity: Mathematical Cosmology, Quantum Gravity.

Applied Mathematics: Group Theory; C^* Algebras non-modular structures; Thermal quantum field theory.

Astroparticle Physics: Interferometer response spectral analysis.

II Conferences and educational activities

II a.: Seminars

Comenius University in Bratislava, Faculty of Mathematics, Physics and Informatics, Bratislava (Slovakia), 5 December 2017-

OML: Analytical expressions for the generic cosmological solution: the limits to the Bianchi solutions.

Sapienza University of Rome, Rome (Italy), Physics Department, Quantum Gravity Meetings Seminar: 16 March 2017-

OML: Feasibility Study: the semiclassical limit approaches for quantum theories of gravity.

II a.: Conference Talks

September 18 - 25 201: School and Workshop on Mathematical Physics, Stará Lesná, Slovakia;
OML: Advantages of quadratic quantization Techniques in the description of the present almost-flat spacetime.

September 10 - 17 2017: Theoretical Physics Workshop and Summer School, Svit, Slovakia;
OML: Imprints of the semiclassical phase of the evolution of the universe on modern quantum-gravity measurements.

II a. : Conferences attended

November 30 - December 1 2017: 2017 13th Central European Seminar on Particle Physics and Quantum Field Theory, University of Vienna, Vienna, Austria.

September 4 - 8 2017: 29th Indian-Summer School of Physics, Topics in particle cosmology, Prague, Czech Republic.

II b Work With Students

II c Diploma thesis supervision

II d Other Teaching Duties

II e. Work With Postdocs

III. Service activities [*activities carried out in collaboration with ICRANet (e.g. teaching activities, conferences etc...) and outside ICRANet (teaching activities in your university etc...)*]

III a. Within ICRANet

III b. : Referee

Referee for Annals of Physics (AOP), Elsevier.

III b. : Editorial Board Member

The Open Conference Proceedings Journal, Editorial Board Member.

American Journal of Modern Physics.

III b. : Editor - special issues

Mathematical and Computational Applications

Journal on Systemics, Cybernetics and Informatics (JSCI) 2017-2020

III b. : Editorial Advisory Board Member

Journal on Systemics, Cybernetics and Informatics (JSCI)

III b.: Reviewer

The open Statistics & Probability Journal

Mathematical and Computational Applications

American Journal of Physics and Applications

III b.: Conference Organization

Technical Program Committee

2017 International Conference on Computer, Mechatronics and Electronic Engineering (WCNE2017)

December 24-25, 2017, Xiamen, China.

International Scientific Committees

2017 Third International Conference on Humanity and Social Science (ICHSS2017)

December 24-25, 2017, Xiamen, China.

International Scientific Committees, Member

2017 2nd International Conference on Electrical, Control and Automation Engineering (ECAE2017)

December 24-25, Xiamen, China.

Technical Program Committee, Member

2017 2nd International Conference on Computer, Mechatronics and Electronic Engineering (CMEE2017)

December 24-25, 2017, Xiamen, China.

Technical Program Committee, Member

2017 International Conference on Mathematics, Modeling and Simulation Technologies and Applications (MMSTA2017)

December 24-25, 2017, Xiamen, China.

International Scientific Committees, Member

2017 3rd International Conference on Social, Education and Management Engineering

(SEME2017)

November 26-27, 2017, Shanghai, China.

Technical Program Committee, Member

2017 2nd International Conference on Applied Mechanics and Mechatronics Engineering

(AMME2017)

November 26-27, 2017, Shanghai, China.

Technical Program Committee, Member

2017 3rd International Conference on Artificial Intelligence and Industrial Engineering

(AIIE2017)

November 26-27, 2017, Shanghai, China.

International Scientific Committees

2017 International Conference on Applied Mathematics, Modeling and Simulation (AMMS2017)

November 26-27, 2017, Shanghai, China.

Scientific Committee Member

International Conference on Mathematical Methods in the Sciences, Engineering and

Technology (MAMESCET 2017)

December 16-17, 2017, Shenzhen, China.

Technical Program Committee, Member

2017 2nd International Conference on Artificial Intelligence: Techniques and Applications

(AITA2017)

September 17-18, 2017 Shenzhen, China.

Technical Program Committee Chair

2017 3rd International Conference on Green Materials and Environmental Engineering

(GMEE2017)

October 22-23, 2017, Beijing, China.

International Scientific Committees: Technical Program Committee/Reviewer member

2017 2nd International Conference on Communications, Information Management and

Network Security (CIMNS2017)

October 22-23, 2017, Beijing, China.

Technical Program Committee Chair

2017 Applied Mechanics, Electronics and Mechatronics Engineering (AMEME2017)

October 22-23, 2017, Beijing, China.

International Scientific Committees- Technical Program Committee

2017 2nd International Conference on Applied Mathematics, Simulation and Modelling

(AMSM2017)

August 6-7, 2017 in Phuket, Thailand

International Scientific Committees

2017 4th International Conference on Advanced Education Technology and Management

Science (AETMS2017)

September 17-18, 2017, Shenzhen, China.

Technical Program Committee Member
2017 3rd International Conference on Applied
Mechanics and Mechanical Automation (AMMA2017)
August 6-7, 2017, Phuket, Thailand.

Technical Program Committee Member
2017 4th International Conference on Education Reform and Modern Management (ERMM
2017)
August 6-7, Phuket, Thailand.

Technical Program Committee Member
MCAE 2017 : 2017 2nd International Conference on Mechatronics, Control and Automation
Engineering
September 17-18, 2017, Shenzhen, China.

Technical Program Committee (TPC)
2017 International Symposium on Applied
Mathematics and Statistics (AMS 2017)
September 24-26, 2017 in Suzhou, China.

Technical Program Committee
Conference on Nuclear Science and Engineering (NSE2017)
October 20-22 2017, Guilin, China

Program Committee
The 8th International Conference on Advances in Physics (CAP 2017)
September 24-26 2017, Suzhou, China
International Scientific Committee

Technical Program Committee/Reviewer member
2017 2nd International Conference on Modelling, Simulation and Applied Mathematics
(MSAM2017)
March 26-27 2017, Bangkok, Thailand

III b.: Participation in Research Consortia

COST Action: The String Theory Universe; European Cooperation in Science and Technology.

e-CA COST Action: CANTATA- Cosmology and Astrophysics Network for Theoretical Advances and
Training e-Actions
(CA15117).

IV. Other

2017 List of Publication

- OML, Geometry of the generical cosmological solution before the singularity limit, [arXiv:1711.07091].
- OML, Semiclassical Length Measure from a Quantum-Gravity Wave Function, Technologies, 5(3), 56 (2017)- Special Issue "Quantum Gravity Phenomenology and Experimental Implications"[arXiv:1708.07895].



Europass Curriculum Vitae

Personal information

First name(s) / Surname(s)	Lombardi CaterinaAntonietta
Address	71, Mezzofanti, 40137, Bologna, Italy
Telephone(s)	+39 349 5948445
E-mail	caterinaant.lombardi@student.unife.it
Nationality	Italian
Date of birth	November, 29th, 1978

Education and training

Dates	December, 2009, onwards
Title of qualification	PhD
Principal subjects/occupational skills covered	
Name and type of organisation	Ferrara University –Department of Physics- Ferrara, Italy
Dates	July, 16th, 2009
Title of qualification	Laurea (diploma + master) in Astronomy

Principal subjects/occupational skills covered

The title of the thesis is “*Dynamical Friction in Stellar Systems with Mass Spectrum: The Case of Blue Straggler Stars in Globular Cluster*”. The Tutor was Prof. Luca Ciotti with the collaboration of Barbara Lanzoni.

In this thesis we developed a new model based on the dynamical friction in order to explain the bimodality distribution that characterize the “exotic” population of the BSS (Blue Straggler Stars) discovered within several globular clusters. Dynamical Friction operates on more massive objects driving them to the cluster center and is more efficient for the most massive stars. Consequently, we suggest that where dynamical friction has worked, the most massive objects (binaries, BSS) can be found in the system core. We present two important time scales for dynamical processes: the relaxation time and the dynamical friction time. They help us to understand in which condition we can replace the study of N-body motion equation with the study of a test mass motion in a mass spectrum system. In the classical theory both the time scale calculations are made with impulsive approximation, analyzing the motion of a test mass in a system of particles all having the same mass.

Relaxation time was estimated from the equipartition of energy. We considered differences between each gravitational encounters. Using this approach we analyzed the orbital deflection of a test mass when it interacts with one of the field stars. Dynamical friction time (it is the time in which the more massive stars are slowing and sinking to the centre) was estimated applying the energy conservation on the relative orbit.

The orbital deflections lead to decompose the velocity in two different components: a perpendicular component and a parallel one (dynamical friction). Then we calculated the two time scales in a stellar system with two different field populations ($N_1 m_1; N_2 m_2$). The main idea of this new approach is based on the important knowledge that the effects of the gravitational encounters can be summed. This consideration leads to a very important result: relaxation time and dynamical friction time can be combined as harmonic average of each time for every mass range.

Finally we introduced a continuous mass spectrum to approximate the field star masses. The spectrum is described by a power law with a variable exponent:

$\psi(m) = A m^{-\alpha}$. Changing the value of the exponent we can explore the effect of a continuous mass spectrum. The main result of this exploratory work is that we proved that dynamical friction time can be shorter than the classical estimate when it is calculated with a continuous mass spectrum. We think that this model can shed new light on the bimodality of the BSS. It will be interesting to analyze the effects of velocity distribution of field stars in the phase space. In fact it is well known that in the context of isotropic speed distribution, the slowing takes place in a selective manner, acting only on the field stars having a velocity dispersion smaller than the test mass velocity. In the ideal case of equipartition of energy among field stars, the velocity dispersion variation is inversely proportional to their mass square root. For this reason we expect that the dynamical friction on the lower mass part of the spectrum is influenced by two antagonistic effects: on one side, a big number effect (the spectrum increasing for low values of the mass) and on the other side a reduction of the effect for the equipartition velocity of the lower masses. Which one of the two effects is dominant can be investigated only taking into consideration the differential distribution function in the phase space.

Name and type of organisation

Bologna University –Department of Astronomy- Bologna, Italy

Date

July, 1996

Title of qualification

Diploma

Name and type of organisation

Liceo Scientifico A. Diaz, Caserta, Italy

Self-assessment

European level (*)

Language English

Understanding		Speaking		Writing
Listening	Reading	Spoken interaction	Spoken production	
good	good	good	good	good

Language ----

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Computer skills and competences

**Operative systems: Microsoft Windows Vista, Xp
Linux
Software: MS Office, OpenOffice, StarOffice, Excell, Latex
Programs: Fortran77, Smongo, maple**

Position: PhD Candidate

Period covered: Cycle XXXII – 2016/2019



I - Scientific Work

In this first year I dealt with three scientific research projects about the study of transient sky:

1. Planning of a specific Fast Radio Bursts (FRBs) radio survey
2. Prospects on short duration Gamma-Ray Bursts (GRBs) with the new Chinese space telescope Insight-HXMT/HE
3. Broadband modeling of GRB afterglows

II - Conferences and educational activities

II - Conferences and Other External Scientific Work

- 8th Young Research Meeting (Cagliari, 29th may – 1st june 2017) - Talk "***Prospects on short GRBs with HXMT***" - Speaker : MARCO MARONGIU

II - Work With Students

- Didactic Tutoring - "***Fisica 1 –I.T. Department***" (20 hours - II Semester) - Prof. Ferruccio Petrucci

III - Service activities [activities carried out in collaboration with ICRANet (e.g. teaching activities, conferences etc...) and outside ICRANet (teaching activities in your university etc...)]

III - Outside ICRANet

- UNIFE Course – "***Statistica e modelli di dati sperimentali***" - Prof. Vincenzo Guidi
- IUSS/UNIFE Course (Complementary skills) – "***English lectorship***" (PET Level) - Prof. Sharon Francois
- IUSS/UNIFE Course (Complementary skills) – "***Comunicare la ricercascientifica***"
- UNIFE Course – "***An introduction to physical cosmology for non experts***" – Prof. Alexander Dolgov

- UNIFE Course—“*Measures and observations of celestial x and gamma rays*” – Prof. Filippo Frontera
- UNIFE Course – “*Observational Cosmology*” – Prof. Piero Rosati

IV - Other

- Science divulgation - (Iglesias, 30th august 2017) "*Viaggioastrofisiconelprofondocosmo: ilmisterodei GRB*" -Speaker : MARCO MARONGIU

2017 List of Publication

- "*Long-term Study of the Double Pulsar J0737-3039 with XMM-Newton: Spectral Analysis*", Egron et al., 2017, ApJ,838,2
- "*Imaging of SNR IC443 and W44 with the Sardinia Radio Telescope at 1.5 and 7 GHz*", Egron et al., 2017, MNRAS, 470,2
- "*Single-dish and VLBI observations of Cygnus X-3 during the 2016 giant flare episode*", Egron et al., 2017, MNRAS, 471,3
- "*Investigating Gamma-Ray Bursts with HXMT*", Amati et al., in prep.

Martone Renato

Position: Ph.D. student
Period covered: 2016-2020



I Scientific Work

Martone et al. - False outliers of the $E_{p,i}$ - E_{iso} correlation?
[10.1051/0004-6361/201730704](https://arxiv.org/abs/10.1051/0004-6361/201730704)

Investigating Gamma-Ray Bursts with HXMT (Amati et al., in prep.)

II Conferences and educational activities

Conferences and Other External Scientific Work

- Theseus Workshop – Naples, 5-6 October 2017
- International School – Gamma Ray Astrophysics with CTA (Sexten (BZ) 24-28 July 2017)

Language Certification exams:

- Cambridge-Esol Certification (Level C1)

Work With Students:

- Assistant for the Fisica I course for the bachelor degree in chemistry
- Assistant for the Fisica I course for the bachelor degree in physics

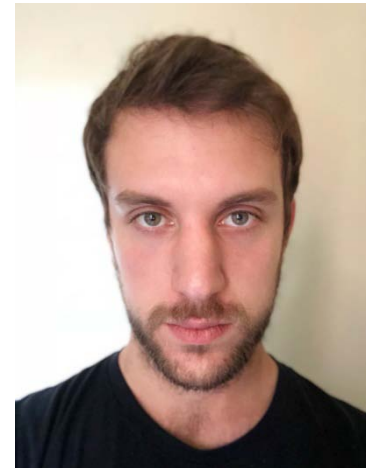
2017 List of Publication

Martone et al. - False outliers of the $E_{p,i}$ - E_{iso} correlation?
[10.1051/0004-6361/201730704](https://arxiv.org/abs/10.1051/0004-6361/201730704)

Melon Fuksman, Julio David

Position: PhD student

Period covered: 2015-2018



I Scientific Work

Numerical hydrodynamics, plasma physics applied to the study of gamma-ray bursts. Radiation hydrodynamics. Formerly Quantum Field Theory, applied to the study of the Casimir Effect.

II Conferences and educational activities

II a. Conferences and Other External Scientific Work

2017 – Speaker at *13th International Conference on Gravitation, Astrophysics, and Cosmology - 15th Italian-Korean Symposium on Relativistic Astrophysics*, Ewha Womans University, Seoul, Korea. Title of the talk: “Simulation of an electron-positron plasma in the context of the IGC paradigm”.

2017 – Speaker at *2017 Annual meeting of the Division of Gravitation and Relativistic Astrophysics of the Chinese Physical Society / Fifth Galileo-Xu Guangqai Meeting*, Chengdu, China. Title of the talk: “Simulation of an electron-positron plasma in the context of the IGC paradigm”.

2017 – Attended *From laboratories to astrophysics: the expanding universe of plasma physics* (school on plasma physics), École de Physique des Houches, Université Grenoble Alpes, Les Houches, France.

2016 - Speaker at *"Supernovae, Hypernovae and Binary Driven hypernovae", an Adriatic Meeting*, International Center for Relativistic Astrophysics, ICRANet headquarters, Pescara, Italy. Title of the talk: “Numerical methods for relativistic plasma physics.”

2016 - Attended *Forth Bego Rencontres (PhD school)*, International Center for Relativistic Astrophysics, Villa Ratti, Nice, France.

2015 - Attended *100^o National Physics Reunion*, Asociación Física Argentina, Merlo, Argentina. Poster presented: “Effective Theories for the Casimir Effect.”

2015 - Attended *Workshop on Astrophysics and Relativity: Astro-GR 2015*, ICTP South American Institute for Fundamental Research, Sao Paulo, Brazil.

2015 - Attended *School on Gravitational Waves: from data to theory and back*, ICTP South American Institute for Fundamental Research, Sao Paulo, Brazil.

2014 - Attended *99° National Physics Reunion*, Asociación Física Argentina, Tandil, Argentina. Poster presented: “Characterization of a scintillation detector system and its implementation in the study of the flux of secondary cosmic rays.”

2013 - Attended *98° National Physics Reunion*, Asociación Física Argentina, Bariloche, Argentina.

III. Service activities

III b. Outside ICRANet

2015 - Teaching assistant, Instituto Balseiro, Argentina. Subject: Quantum Mechanics I.

2011-2012 - Undergraduate teaching assistant, Universidad Nacional de Mar del Plata, Argentina. Subjects: Physics I, Mathematical Analysis I, Linear Algebra II.

2017 List of Publications

Regular articles

- R. Ruffini et al., “Early X-Ray Flares in GRBs”, *The Astrophysical Journal*, **852**, 53 (2018).
- J. D. Melon Fuksman, C. D. Fosco, “Casimir Interaction between two smoothly deformed cylindrical surfaces”, *Phys. Rev. D* **96**, 076015 (2017).
- R. Ruffini et al., “The cosmic matrix in the 50th anniversary of relativistic astrophysics”, *International Journal of Modern Physics D*, Volume **26**, Issue 10 (2017).
- J. A. Rueda et al., “The binary systems associated with short and long gamma-ray bursts and their detectability”, *International Journal of Modern Physics D*, Volume **26**, Issue 09 (2017).

Proceedings

- J. D. Melon Fuksman et al., “Evolution of an electron-positron plasma produced by induced gravitational collapse in binary-driven hypernovae”, *Joint International Conference of ICGAC-XIII and IK-15 on Gravitation, Astrophysics and Cosmology*, *EPJ Web of Conferences* **168**, 04009 (2018).
- M. Muccino et al., “What can we learn from GRBs?”, *Joint International Conference of ICGAC-XIII and IK-15 on Gravitation, Astrophysics and Cosmology*, *EPJ Web of Conferences* **168**, 01015 (2018).
- D. Primorac et al., “GRB 110731A within the IGC paradigm”, *Joint International Conference of ICGAC-XIII and IK-15 on Gravitation, Astrophysics and Cosmology*, *EPJ Web of Conferences* **168**, 04008 (2018).

- J. Rueda et al., “The binary systems associated with short and long gamma-ray bursts and their detectability”, Proceedings of the MG14 Meeting on General Relativity, ISBN: 978-981-3226-59-3 (2017).
- R. Ruffini et al., “The cosmic matrix in the 50th anniversary of relativistic astrophysics”, Proceedings of the MG14 Meeting on General Relativity, ISBN: 978-981-3226-59-3 (2017).

Menegoni Eloisa

Position: Ph.D student

Period covered: November 2009 – October 2012



I Scientific Work

II Conferences and educational activities

II a Conferences and Other External Scientific Work

- 'VIII Mexican School of the Gravitation and Mathematical Physics Division of the Mexican Physical Society: Speakable and Unspeakable in Gravitational Physics', held in Playa del Carmen, Mexico, 6-12 December 2009.
- 'Cosmology on the Beach: Essential Cosmology for the Next Generation' organized by Berkeley Center for Cosmological Physics (USA) and Instituto Avanzado de Cosmologia (Mexico) -Playa del Carmen, Qroo., Mexico, January 11-15, 2010.
- 'IRAP Ph.D Lectures' Nice Observatoire de la Cote d'Azur, Nice, France, February 1-5, 2010.
- 'X-/gamma-ray observational astrophysics and prospects', IRAP School in Ferrara, Italy, March 23-24, 2010.
- '5th Iberian Cosmology Meeting' in Porto, Portugal, from 29th to 31th of March, 2010, and organized by the 'Centro de Astrofisica da Universidade do Porto'.
- 'HORIBA INTERNATIONAL CONFERENCE COSMO/CosPA2010' at the University of Tokyo, Japan, from 27th of September to 1th of October, 2010.
- Miami2010: A topical conference on elementary particles, astrophysics, and cosmology' held in Fort Lauderdale (FL), USA, from 14th to 19th of December, 2010.
- Planck:LFI-Core Team' held in Bolognue, Italy, from 17th to 18th of January, 2011.
- Planck:LFI-Core Team' held in Pasadena, California (USA), from 14th to 18th of February, 2011.
- Planck:LFI-Core Team' held in Bolognue, Italy, from 7th to 10th of March, 2011.
- IRAP Ph.D and Erasmus mundus workshop: Recent News from the MeV, GeV and TeV Gamma-Ray Domains' held in Pescara, Italy, from 21th to 26th of March, 2011.
- IRAP Ph.D and Erasmus Mundus workshop: From Nuclei to White Dwarfs and Neutron Stars' held in Les Houches, France, from 3th to 8th of April, 2011.

- ‘Planck Joint Core Team meeting’ held in Paris at the Laboratoire de l’Accelérateur Lineaire Orsay , France, from 2th to 4th of May, 2011.
- ‘School of Astrophysics ‘Francesco Lucchin’, XI Cycle, III Course’ held in Bertinoro, Italy, from 8th to 13th of May, 2011.
- Azores School on Observational Cosmology’, held in Angra do Heroísmo, Azores, Portugal from 1th–5th of September, 2011.
- Erasmus mundus-IRAP PhD Lectures Université de Nice Sophia Antipolis’, held in Nice, France, from 13th – 15th of September, 2011.
- ‘3rd Galileo-Xu GuangQi Meeting,’ held at National Astronomical Observatory of the Chinese Academy of Sciences, in Beijing, China, from 11th – 15th of October, 2011.
- ‘Planck:JCT-Core Team’ held in Bolognue, Italy, from 14th to 18th of November, 2011.
- ‘Scientific and Technical Computing in C++’ held at CASPUR-HPC Department in Rome, Italy, from 29th of November to 2th of December, 2011.
- ‘Cosmology on the Beach: Essential Cosmology for the Next Generation’ organized by Berkeley Center for Cosmological Physics (USA) and Instituto Avanzado de Cosmologia (Mexico) Cancun, Mexico, January 16-20,2012.
- ‘Planck:CTP-meeting’ held in Ferrara, Italy, from 7th to 10th of February, 2012.
- ‘Planck Conference’ held in Bolougne, Italy, on the 16th of February, 2012.
- ‘Scientific and Technical Computing in Fortran95’ held at CASPUR- HPC Department in Rome, Italy, from 17th – 20th of April, 2012.
- ‘Planck: JCT-meeting’ held in Paris, France, on the 9th–11th of May, 2012.
- EUCLID Consortium Conference held in Copenhagen, Denmark, on the 14th – 18th of May, 2012.
- ‘13rd Marcel Grossmann Meeting -MG13,’ held at ‘Stockholms Universitet’, in Stockholm, Sweden, from 1th – 7th of July, 2012.
- ‘XI Cosmology School’, held at ‘IESC’, in Cargese, France, from 17th– 21th of September, 2012.

II b Diploma thesis supervisor and title

“CONSTRAINTS ON FUNDAMENTAL PHYSICS FROM COSMIC MICROWAVE BACKGROUND DATA ANALYSIS” Advisor Prof. Alessandro Melchiorri

II c Other Teaching Duties

TALKS in conferences:

- Poster and Talk ‘New constraints on variations of the fine structure constant from CMB anisotropies’ at XIst Cosmology School, held at IESC, in Cargese, France, from 17th to 21th of September, 2012.

- 'The Fine Structure Constant and the CMB Damping Scale' at '13rd Marcel Grossmann Meeting -MG13', held at 'Stockholms Universitet', in Stockholm, Sweden, from 1th – 7th of July, 2012.
- Poster 'New constraints on variations of the fine structure constant from CMB anisotropies' at 'Cosmology on the Beach: Essential Cosmology for the Next Generation', conference organized by Berkeley Center for Cosmological Physics (USA) and Instituto Avanzado de Cosmologia (Mexico) Cancun, Mexico, January 16-20, 2012.
- 'Constraining variations on the fine structure constant from next survey experiment' at '3rd Galileo-Xu GuangQi Meeting', held at National Astronomical Observatory of the Chinese Academy of Sciences, in Beijing, China, from 11th – 15th of October, 2011.
- 'Cosmological constraints on variations of fundamental constants from CMB data' at Azores School on Observational Cosmology', held in Angra do Heroísmo, Azores, Portugal from 1th – 5th of September, 2011.
- 'Cosmological constraints on variations of fundamental constants from CMB data' at IRAP Ph.D and Erasmus Mundus Workshop: 'Recent News from the MeV, GeV and TeV Gamma-Ray Domains' held in Pescara, Italy, from 21th – 26th of March, 2011.
- 'Cosmological constraints on variations of fundamental constants' at Miami2010: A topical conference on elementary particles, astrophysics, and cosmology' held in Fort Lauderdale (FL), USA, from 14th– 19th of December, 2010.
- 'Cosmological constraints on variations of fundamental constants' at 'Horiba International conference COSMO/CosPA2010' held at the University of Tokyo, Japan, from 27th of September to 1th of October, 2010.
- 'New constraints on variations of fundamental constants from CMB anisotropies' at 'Iberian Cosmology Meeting' held in Porto, Portugal, from 29th to 31th of March, 2010.
- 'New constraints on the fine structure constant from CMB anisotropies' at the Observatoire de la Côte d'Azur, Nice, France (February 4, 2010).

III. Service activities

III a. Within ICRANet:

Ph.D lessons

III b. Outside ICRANet

- Member of Planck-LFI Core Team.
- Member of Euclid collaboration.
- Visiting Student at the JPL (Jet Propulsion Laboratory), Pasadena, California, from 27 of July to 20 of August, 2012, under the supervision of Dr. Graca Rocha and Dr. Loris Colombo.
- Visiting Student at the Institut für Theoretische Physik University of Heidelberg, Germany, from 6th to 10th of December, 2011, under the supervision of Professor Luca Amendola.

- Visiting Student at JPL (Jet Propulsion Laboratory), Pasadena, California, from 13 of June to 13 of July, 2011, under the supervision of Dr. Graca Rocha.

- Junior Specialist with fellowship for the Department of Physics and Astronomy at the University of California, Irvine, from June 21 to September 20, 2010 under the supervision of Prof. Asantha Cooray, Full Professor in the Department of Physics and Astronomy.

- Other

Prize of the Wolfram Mathematica 8 for the best talk at the conference Miami2010: A topical conference on elementary particles, astrophysics, and cosmology' held in Fort Lauderdale (FL), USA, from 14th to 19th of December, 2010.

Curriculum Vitae et Studiorum

PERSONAL DATA:

Name and Surname: Simone Mercuri
Date and place of birth: 12 Ottobre 1977, Nettuno, Rome
Home Address: Via delle Ortensie 3, 00048 Nettuno (Roma), Italy
Nationality: Italian
Home Telephone: +39/06/9803941
Mobile telephone: +39/338/5711981
e-mail: mercuri@icra.it

RESEARCH INTERESTS:

- Quantum Gravity:
Canonical Quantization Program; Problem of Time; Reference Systems; Quantum Cosmology.
- General Relativity:
Canonical Formalism; Self-dual Connections; Spinor Matter Fields; Torsion.
- Quantum Field Theory:
Path-integral Formulation; Non-perturbative Background Independent Functional Approach.

SCIENTIFIC ACTIVITY:

- March 2002 - March 2003.
He develops his thesis work under the supervision of Dr Giovanni Montani working in the group G9 (Relativistic Astrophysics group) directed by Prof. Remo Ruffini in the University of Rome “La Sapienza”. The thesis proposes an evolutionary reformulation of non-perturbative quantum gravity, in particular starting from a conceptual critique to the splitting of space-time procedure, an ideal matter is introduced in order to fix in a mathematically consistent way a reference system with respect to which the concepts of space and time can be naturally recovered.
- March 2003.
He graduates in Physics at the University of Rome “La Sapienza” with full marks and honors (110/110 cum laude), disputing a thesis entitled: *Evolutionary Quantization of Gravity: Canonical and Path-Integral Formalism*.
- July 20 - 26, 2003.
He takes part in the “X Marcel Grossmann meeting on Relativistic Astrophysics”, held in Rio de Janeiro (Brazil), presenting a talk entitled: *Revised quantum geometrodynamics: canonical and path-integral approach*. In collaboration with Dr Giovanni Montani he prepares a contribution for the proceedings of the meeting, obtaining its publication.
- S. Mercuri, G. Montani, *On the frame fixing in quantum gravity*, proceedings of the X Marcel Grossmann meeting, July 20 - 26, 2003, Rio de Janeiro (Brazil), eds. S. Perez-Bergliaffa and R. Ruffini (World Scientific, Singapore, 2005), available on arXiv.org: gr-qc/0401127.
- August 18 - 23, 2003.
He takes part in the “VIII Italian-Korean Symposium on Relativistic Astrophysics”, held in Rome and Pescara (Italy), presenting a talk entitled *A new approach in quantum gravity and its cosmological*

implications. He collaborates with Dr Giovanni Montani to the writing of a contribution for the proceeding of the meeting, which besides original material, contains also a brief review on the problem of time in quantum gravity. The paper is accepted for publication

- S. Mercuri, G. Montani, *A new approach in quantum gravity and its cosmological implications*, Nuovo Cim. **120B**, 1137-1168, (2005), available on arXiv.org: gr-qc/0401102.

- September 2003.

He collaborates to a paper containing a series of new results about the problem of time in Quantum Gravity. These results are obtained operating the $3 + 1$ -slicing of space-time via the definition of a *kinematic action*, which provide a precise dynamical and physical meaning to the space-time splitting. The paper is accepted for publication:

- S. Mercuri, G. Montani, *Revised canonical quantum gravity via frame fixing*, Int. Jour. Mod. Phys. **D13**, 165-186, (2004), available on arXiv.org: gr-qc/0310077.

- November 2003 - October 2006.

He is admitted in the IRAP-PhD (International Relativistic Astrophysics PhD Program), granted by a fellowship of the University of Rome “La Sapienza”. This PhD is a co-tutorship of the following international institutions: Università degli studi di Roma “La Sapienza”, Freie Universität Berlin, ETH Zurich, Observatoire de la Côte d’Azur, Université de Nice Sophia Antipolis, Université de Savoie.

- November 2003 - June 2004.

He continues to study the problem of time in quantum gravity. In collaboration with Dr Giovanni Montani he publishes a paper in which a dualism between the fixation of a physical frame and the emergence of time in non-perturbative quantum gravity is established. The obtained result is in accordance with the previous results, furthermore it demonstrates also the opposite implication, namely the semiclassical limit of evolutionary equations yields a gravitational system coupled with ideal matter fields. The paper is published:

- S. Mercuri, G. Montani, *Dualism between physical frames and time in quantum gravity*, Mod. Phys. Lett. **A19**, 1519-1527, (2004), available on arXiv.org: gr-qc/0312077.

This work together with the previous one has represented the starting point for future cosmological applications.

- July 2004.

He begins to study the new formalism for General Relativity introduced by Prof. Abhay Ashtekar. This formalism, reducing the phase space of General Relativity to that of a particular Yang-Mills theory, represents a remarkable step forward for the program of non-perturbative quantization of the gravitational field. He, in particular, studies the physical consequences of the presence of the so called Immirzi parameter on systems of spinors.

- September 2004.

In collaboration with Dr Giovanni Montani, he begins to work on a new research theme. The idea is to study the role the Lorentz group has in the gravitational theory when a coupling with spinor field is considered. Spinors as well known are a particular representation of the Lorentz group, in curved space-time the Lorentz rotations are promoted to local gauge symmetry, but the associated spin connections have not an independent dynamical role, in fact they can be expressed as function of the gravitational field. In order to promote the Lorentz group to independent gauge symmetry, we introduce a new connection which, at least in vacuum, can be directly identified with the torsion tensor. This theory represents an extension of General Relativity in order to include torsion, which

in this approach plays the role of gauge connection of the local Lorentz group. The source of this new field is the density of spin, which simultaneously interacts also with the spin connections producing a complicate interaction between the gravitational and new connection fields.

- March 9, 2005.

He is invited to present a seminar in the Department of Physics at the University of Rome “La Sapienza” entitled *Torsion as a gauge field of the Lorentz group*.

- June 27 - July 3, 2005.

He takes part in the “I Russian-Italian Lifshitz-Zeldovich meeting on Relativistic Astrophysics” held in Pescara at the ICRA-Net center, presenting a talk entitled *The contortion field as a candidate for a gauge theory of the Lorentz group*.

- July 19 - 24, 2005.

He takes part to the “IX Italian-Korean Symposium on Relativistic Astrophysics”, held in Seoul (Korea) and Mt. Kumgang (D.P.R. Korea), presenting a talk entitled *Physical consequences of the Immirzi parameter*.

- September 2005.

In collaboration with Dr Giovanni Montani, he prepares a paper containing the results obtained during the study of the relation between the torsion field and the gauge field of the local Lorentz symmetry. This arguments is still under study and, with the collaboration of Dr Lecian, a discussion of the physical consequences due to the presence of such a connection field has been added.

-O.M. Lecian, S. Mercuri, G. Montani, *Torsion and the gauge field of the Lorentz group*, (2005), submitted to *Mod. Phys. Lett. A*, available soon on arXiv.org

- January 2006.

He presents a work about the description of spinor fields in the Ashtekar formalism for General Relativity, proposing a new spinors action, motivated by the fact that the usual minimal coupling leads to an effective action which is not equivalent to that of the Einstein-Cartan theory. In order to obtain the right effective low energy limit is necessary to introduce a non-minimal coupling, which, together with the Holst modification to the Hilbert-Palatini action, reduces to a total divergence once the second Cartan structure equation is satisfied. The introduced modifications to the usual action have a clear topological explanation, being the geometrical elements constituting the Nieh-Yan topological invariant. The non minimal term suggests also the possibility to separate the total action in a “left” and “right” part, allowing a formal simplification of the constraints of the total system.

- S. Mercuri, *Fermions in Ashtekar-Barbero Connections Formalism for Arbitrary Values of the Immirzi Parameter*, *Phys. Rev. D* **73**, 084016, (2006), available on arXiv.org: gr-qc/0601013.

- February 9, 2006.

In occasion of the “I Bego Scientific Rencontre on Relativistic Astrophysics” held at the University of Nice “Sophia Antipolis” in Nice (France), he presents a seminar entitled *Torsion as a gauge field of the Lorentz group and extension of General Relativity in Ashtekar formalism*.

- April 11 and May 8, 2006.

He presents at the University of Rome “La Sapienza”, two seminars entitled *Lorentz invariance and space(-time) discreteness* and *The Ashtekar-Barbero-Immirzi connections*, in occasion of a series of discussions entitled “Lectures of Quantum Gravity”, organized by Dr Giovanni Montani and Dr Giovanni Amelino-Camelia.

- June 25 - July 1, 2006

He takes part in the “I Stueckelberg Workshop on Relativistic Astrophysics”, held in Pescara at the ICRA-Net Center, presenting a talk entitled *The role of Nieh-Yan invariant in Ashtekar-Barbero-Immirzi formalism*. The meeting is organized in occasion of a series of Lectures on Loop Quantum Gravity and Loop Quantum Cosmology held by Prof. Abhay Ashtekar.

- July 23 - 29, 2006.

He takes part in the “XI Marcel Grossmann meeting on Relativistic Astrophysics”, held in Berlin (Germany), presenting two talks entitled: *Nihe-Yan invariant and fermions in Ashtekar-Barbero-Immirzi formalism* and *Is torsion a fundamental gauge field?*. He presented the following contribution

- S. Mercuri, *Nihe-Yan invariant and fermions in Ashtekar-Barbero-Immirzi formalism*, in press, World Scientific (Singapore), available on arXiv.org: gr-qc/0610026.

- O.M. Lecian, S. Mercuri, G. Montani, *Is torsion a fundamental gauge field?*, in press World Scientific (Singapore), available soon on arXiv.org.

- September 2006

He begins to write his PhD thesis entitled *Time, Matter and Symmetries in Canonical Quantum Gravity*, which must be finished before December 15, 2006.

- Next year 2007

In the next year he will begin to collaborate with the Quantum Gravity group of the University of Marseille directed by Prof. Carlo Rovelli, granted by a fellowship of the University of Rome “La Sapienza” and a fellowship of the Italian Foundation “A. Della Riccia”.

PUBLICATIONS:

1. S. Mercuri, *Nihe-Yan invariant and fermions in Ashtekar-Barbero-Immirzi formalism*, proceedings of the XI Marcel Grossmann meeting, July 23 - 29, 2006, Berlin (Germany), (2006), in press World Scientific (Singapore), available on arXiv.org: gr-qc/0610026.
2. O.M. Lecian, S. Mercuri, G. Montani, *Is torsion a fundamental gauge field?*, proceedings of the XI Marcel Grossmann meeting, July 23 - 29, 2006, Berlin (Germany), (2006), in press, available soon on arXiv.org.
3. S. Mercuri, *Fermions in Ashtekar-Barbero Connections Formalism for Arbitrary Values of the Immirzi Parameter*, *Phys. Rev.* **D73**, 084016, (2006), available on arXiv.org: gr-qc/0601013.
4. O.M. Lecian, S. Mercuri, G. Montani, *Torsion and the gauge field of the Lorentz group*, (2005), submitted to *Mod. Phys. Lett. A*, available soon on arXiv.org.
5. S. Mercuri, G. Montani, *On the frame fixing in quantum gravity*, proceedings of the X Marcel Grossmann meeting in Rio de Janeiro (Brasil), July 2003, eds. S. Perez-Bergliaffa and R. Ruffini, World Scientific (Singapore), (2005), available on arXiv.org: gr-qc/0401127.
6. S. Mercuri, G. Montani, *A new approach in quantum gravity and its cosmological implications*, *Nuovo Cim.* **120B**, 1137-1168, (2005), available on arXiv.org: gr-qc/0401102.
7. S. Mercuri, G. Montani, *Dualism between physical frames and time in quantum gravity*, *Mod. Phys. Lett.* **A19**, 1519-1527, (2004), available on arXiv.org: gr-qc/0312077.
8. S. Mercuri, G. Montani, *Revised canonical quantum gravity via frame fixing*, *Int. Jour. Mod. Phys.* **D13**, 165-186, (2004), available on arXiv.org: gr-qc/0310077.

EDUCATION:

Date (from - to): October 2003 - April 2005
Name of the institution: University of Rome “La Sapienza”.
Main subjects of the course: During the IRAP-PhD (International Relativistic Astrophysics PhD Program) attended the following courses:

- *Differential Geometry*, held by Prof. S. Marchiafava (October 2003 - January 2004).
- *Physics of the Gravitational Field*, held by Dr G. Montani (March - June 2004).
- *Algebraic Topology*, held by Prof. P. Piccinni (March - June 2004).
- *Relativistic cosmology and beyond* held by Dr G. Montani, March - May 2005.
- *Covariant kinetic theory* held by Prof. Jürgen Ehlers, April 2005.

WINTER SCHOOLS:

Date (from - to): February 2006.
Name of the institution: University of Nice “Sophia Antipolis”, Nice (France).
Title of the course: School of Relativistic Astrophysics.
(I Bego Scientific Rencontre on Relativistic Astrophysics)
Main subjects of the course: Einstein-Maxwell systems, compact binaries systems, black holes and gravitational collapse.

Gennaio 10 - 27, 2006.
ETH Zurich, Zurich (Switzerland).
Mathematical Problems in General Relativity.
Cauchy problem, asymptotic flatness and conserved quantities in General Relativity.

SUMMER SCHOOLS:

Date (from - to): June 15 - July 15, 2004.
Name of the institution: Free University of Berlin, Berlin (Germany).
Title of the course: “I IRAP-PhD Summer School”, lectures held by Prof. Hagen Kleinert entitled *Selected topics on quantum field theories*, 60 hours.
Main subjects of the course: Gauge theories, path-integral formalism, Faddeev-Popov formula, ghosts, scattering amplitudes.

Date (from - to): September 1 - 15, 2005
 Name of the institution: ICRA-Net Center (International Center for Relativistic Astrophysics), Pescara (Italy).
 Title of the courses “II IRAP-PhD Summer School”

- *Selected topics on quantum field theory II*, held by Prof. Hagen Kleinert, 20 hours.
- *Selected topics on statistical mechanics*, held by Prof. Axel Pelster, 20 hours.
- *Selected topics on cosmology*, held by Prof. Frank Steiner 20 hours.

REFRESHER COURSES:

Date (from - to): March - June 2006
 Name of the institution: University of Rome “La Sapienza”.
 Title of the course: Lectures on Quantum Gravity (30 ore).
 A series of Lectures on arguments of non-perturbative quantum gravity and non-commutative geometry, organized by Dr G. Montani and Dr G. Amelino-Camelia.

SEMINARS:

Date: May 8, 2006
 Name of the institution: University of Rome “La Sapienza”.
 Title of the seminar: *The Ashtekar-Barbero-Immirzi connections*.
 Ambit of the seminar: Lectures of Quantum Gravity, (see above).

11 Aprile 2006
 University of Rome “La Sapienza”.
Lorentz invariance and space(-time) discreteness.
 Lectures of Quantum Gravity.

February 9, 2006
 University of Nice “Sophia Antipolis”.
Torsion as a gauge field of the Lorentz group and extension of General Relativity in Ashtekar formalism.
 I Bego Scientific Rencontre on Relativistic Astrophysics.

March 9, 2005
 University of Rome “La Sapienza”.
Torsion as a gauge field of the Lorentz group.
 Physics Department seminars.

CONFERENCES AND MEETINGS:

Date (from - to): July 23 - 29, 2006
Name of the Meeting: XI Marcel Grossmann meeting on Relativistic Astrophysics.
Place of the Meeting: Berlin, Germany.
Title of the talk(s): *Niher-Yan invariant and fermions in Ashtekar-Barbero-Immirzi formalism.*
Is torsion a fundamental gauge field?

June 25 - July 1, 2006
I Stueckelberg Workshop on Relativistic Astrophysics.
ICRA-Net Pescara.
The role of Nieh-Yan invariant in Ashtekar-Barbero-Immirzi formalism.

July 19 - 24, 2005
IX Italian-Korean Symposium on Relativistic Astrophysics.
Seoul, Korea and Mt. Kungang D.P.R. Korea.
Physical consequences of the Immirzi parameter.

June 27 - July 3, 2005.
I Russian-Italian Lifshitz-Zeldovich meeting on Relativistic Astrophysics.
ICRA-Net Center, Pescara (Italy).
The contortion field as a candidate for a gauge theory of the Lorentz group.

Date (from - to): June 10 - 20, 2005
Name of the meeting: II Italian-Sino Workshop on Relativistic Astrophysics.
Place of the meeting: ICRA-Net Center, Pescara (Italy).

March 29 - April 2, 2005
Space-time in action.
Università di Pavia.

September 20 - 23, 2004
Testing the Equivalence Principle on Ground and in Space.
ICRA-Net Center, Pescara (Italy).

Date (from - to): August 18 - 23, 2003
Name of the meeting: VIII Italian-Korean Symposium on Relativistic Astrophysics.
Place of the meeting: University of Rome "La Sapienza" Roma and ICRA-Net Center Pescara Italy.
Title of the talk: *A new approach in quantum gravity and its cosmological implications.*

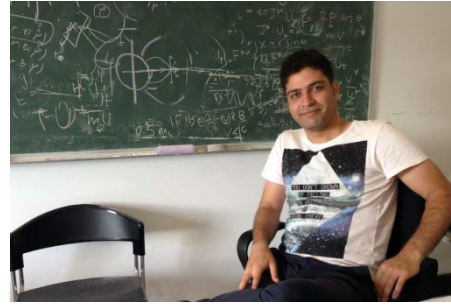
Date (from - to): July 20 - 26, 2003
Name of the meeting: X Marcel Grossmann meeting on Relativistic Astrophysics.
Place of the meeting: Rio de Janeiro, Brazil.
Title of the talk: *Revised geometrodynamics: canonical and path-integral approach.*

TEACHING EXPERIENCES:

Period of teaching: Academic Year 2004 - 2005
Name of the institution: University of Rome “La Sapienza”.
Subject: First year Physics class for Pharmacy and Chemistry

Moradi Rahim

Position: IRAP PhD Thirteenth Cycle
Period covered: 2014-2017



I Scientific Work

GRBs, Blackholes, evolving Black Holes and their connections with GRBs.

II Conferences and educational activities

International Conference on Gravitation : Joint Conference of ICGAC-XIII and IK15
Charged Cosmological Black holes

2017 List of Publication

1. Charged cosmological black hole. Rahim Moradi, Clément Stahl, Javad Firouzjaee, She-Sheng XuePhys.Rev. D96 (2017) no.10, 104007
2. Early X-ray Flares in GRBs.R. Ruffini et al.. Astrophys.J. 852 (2018) no.1, 53
3. Expansion of magnetic neutron stars in an energy (in)dependent spacetime.B. Eslam Panah, G.H. Bordbar, S.H. Hendi,R. Ruffini, Z. Rezaei, R. MoradiAstrophys.J. 848 (2017) no.1, 24

Stefania Pandolfi



Position: 3rd year IRAP PhD Student (VII cycle)

Period covered: 1Nov 2008 – 30 Oct 2011

I Scientific Work

1. Data-constrained reionization and its effect on cosmological parameters Stefania Pandolfi, Andrea Ferrara, T. Roy Choudhury, Alessandro Melchiorri, Sourav Mitra submitted to PRD, arXiv:1111.3570v1 [astro-ph.CO]

2. Constraints on massive sterile neutrino species from current and future cosmological data. Elena Giusarma , Martina Corsi, Maria Archidiacono, Roland de Putter , Alessandro Melchiorri , Olga Mena , Stefania Pandolfi.
Published in Phys.Rev. D83 (2011) 115023, e-Print: arXiv:1102.4774 [astro-ph.CO]

3. Impact of general reionization scenarios on extraction of inflationary parameters Stefania Pandolfi, Elena Giusarma, Edward W. Kolb, Massimiliano Lattanzi, Alessandro Melchiorri, Olga Mena, Manuel Pena, Asantha Cooray, and Paolo Serra, Phys.Rev.D82:123527,2010 , arXiv:1009.5433v1 [astro-ph.CO].

4. CMB neutrino mass bounds and reionization M. Archidiacono, A. Cooray, A. Melchiorri, S. Pandolfi, Phys. Rev. D 82, 087302 (2010), arXiv:1010.5757 [astro-ph.CO].

5. The Herschel-SPIRE Legacy Survey (HLS): the scientific goals of a shallow and wide submillimeter imaging survey with SPIRE A. Cooray et al., HLS Science Team, arXiv:1007.3519 [astro-ph.CO]

6. Harrison-Zel'dovich primordial spectrum is consistent with observations S. Pandolfi, A. Cooray, E. Giusarma, E. W. Kolb, A. Melchiorri, O. Mena and P. Serra, Phys. Rev. D 81, 123509 (2010) - Published June 9, 2010, arXiv:1003.4763 [astro-ph.CO].

7. Inflation with primordial broken power law spectrum as an alternative to the concordance cosmological model Stefania Pandolfi, Elena Giusarma, Massimiliano Lattanzi, Alessandro Melchiorri, Phys. Rev. D 81, 103007 (2010) - Published May 24, 2010

8. Constraints on the dark energy equation of state in presence of a varying fine structure constant Eloisa Menegoni, Stefania Pandolfi, Silvia Galli, Massimiliano Lattanzi, and Alessandro Melchiorri, International Journal of Modern Physics D, Vol. 19, No. 4 (2010) pp. 507-512

9. No evidence for dark energy dynamics from a global analysis of cosmological data Paolo Serra, Asantha Cooray, Daniel E. Holz, Alessandro Melchiorri, Stefania Pandolfi,

and Devdeep Sarkar, Phys. Rev. D 80, 121302 (2009), Rapid Communication,
Published December 29, 2009

10. When Did Cosmic Acceleration Start? Alessandro Melchiorri, Luca Pagano, Stefania Pandolfi, Phys. Rev. D 76, 041301, Rapid Communication, (2007)

II Conferences and educational activities

II a Conferences and Other External Scientific Work

- “Inflation in a general reionization scenario” Essential Cosmology for the Next Generation, Puerto Vallarta , Mexico, January 10-14, 2011
- "Constraints on Inflation in extended cosmological scenarios" Dark Cosmology Center (DARK), Copenhagen, Denmark, 27 - 28 January
- "Joint Astrophysical and Cosmological constraints on reionization", DAVID WORKSHOP VI, Scuola Normale Superiore, Pisa, October 18-20 2011

IV. Other

- Member of the LOC of the DEUS Dark Summer Workshop 8-12 August 2011, Copenhagen, Denmark.
- Member of the LOC of Azores School on Observational Cosmology, 31 August- 6 September 2011, Angra do Heroismo, Azores, Portugal

2011 List of Publication

1. Data-constrained reionization and its effect on cosmological parameters Stefania Pandolfi, Andrea Ferrara, T. Roy Choudhury, Alessandro Melchiorri, Sourav Mitra
submitted to PRD, arXiv:1111.3570v1 [astro-ph.CO]
2. Constraints on massive sterile neutrino species from current and future cosmological data. Elena Giusarma , Martina Corsi, Maria Archidiacono, Roland de Putter ,
Alessandro Melchiorri , Olga Mena , Stefania Pandolfi.
Published in Phys.Rev. D83 (2011) 115023, e-Print: arXiv:1102.4774 [astro-ph.CO]
3. The impact of Reionization modelling on CMB Neutrino Mass Bounds,
M. Archidiacono, A. Melchiorri, S. Pandolfi,
Proceedings of the Neutrino Oscillation Workshop (Sept. 2010), Nuclear Physics B
Proceedings Supplements, Volume 217, Issue 1, p. 65-67.
4. Impact of general reionization scenarios on extracting inflationary parameters , Proceedings
of the 25th Texas Symposium on Relativistic Astrophysics (Dec. 2010),
PoS (Texas 2010) 263

Curriculum vitae of Barbara Patricelli

PERSONAL DATA

Date and Place of birth

April 16, 1980, Ortona (CH), Italy

Citizenship

Italian

Address

Physics Department, University of Rome “La Sapienza”

Piazzale Aldo Moro 5

00185 Roma, Italy

Telephone

+39 06 4991 4299

E-mail

barbara.patricelli@icranet.org

EDUCATION

October 2006: Department of Physics and ICRA (International Center for Relativistic Astrophysics), University of Rome “La Sapienza”, Italy, admission to the International Relativistic Astrophysics Ph.D. Program (IRAP PHD) with a fellowship.

July 2006: University of L'Aquila, Italy, Specialistic Degree in Physics, grade 110/110 cum laude. Title of the Thesis: "The spectral energy distribution of stars in population synthesis techniques". Supervisors: Prof. Enzo Brocato, Dott.ssa Gabriella Raimondo.

April 2002: University of L'Aquila, Triennial Degree in Physics, grade 102/110. Title of the Thesis: "Earthquake forecast: present state and future perspective". Supervisors: Prof. Piero Monacelli, Dott.ssa Antonella Amoruso.

Luglio 1999: Technical-Commercial High School "L. Einaudi", Ortona (Ch), Italy, Technical High School Diploma, grade 100/100.

OBSERVATIONAL EXPERIENCES

2003: Observation of binary systems HD190042 e HD132844 with the Teramo-Normale-Telescope (TNT) in the Astronomical Observatory of Collurania-Teramo (Italy), within the program of photometric support to the search of extrasolar planets with SARG (Spettrografo Alta Risoluzione Galileo).

COMPUTERS

Operating systems: Windows, Linux

Programmming languages: Fortran

Data reduction and analysis: Midas, Iraf, Romafot

Synthetic photometry packages: Synphot

Scientific: Mathematica

Plotting packages: Gnuplot, SuperMongo

Typography: Latex

LANGUAGES

Italian: Native language

English: Spoken (good); written (good); listening comprehension (good)

RELEVANT EXPERIENCES

2005-2006: Stage at the OACT about the transformation of stellar observable quantities from the theoretical plane to the observational one in the Optical and Near-Infrared.

MEETINGS AND SCHOOLS

- 1th Cesare Lattes Meeting on Gamma Ray Bursts, Black Holes and Supernovae, Mangaratiba (Brazil), February 25 - March 3, 2007
- 10th Italian-Korean Symposium on Relativistic Astrophysics, Pescara (Italy), June 25 - 30, 2007
- 4th Italian-Sino Workshop on Relativistic Astrophysics, Pescara (Italy), July 20 - 30, 2007
- National School of Astrophysics, 9th cycle, 2th course, Isola di San Servolo - Venezia (Italy), September 16 - 22, 2007

CONTRIBUTED TALKS

July 2007: “On the charge to mass ratio of neutron cores and heavy nuclei”, contributed talk presented at ”‘IV Italian-Sino Workshop”’, Pescara (Italy), July 20-30, 2007.

PUBLICATIONS

B. Patricelli, M. Rotondo, R. Ruffini, 2007: On the charge to mass ratio of neutron cores and heavy nuclei, Italian-Sino Workshop on Relativistic Astrophysics, Pescara (Italy), July 20 - 30, 2007. To be published in the American Institute of Physics-Conference Proceedings.

Peirani Sébastien

Nationality : French
Single

Tel : +33 (0)1 44 32 81 34

Fax : +33 (0)1 44 32 80 01

Email : peirani@iap.fr

Office address : Institut d'Astrophysique de Paris
98 bis, Boulevard Arago - 75014 Paris

Professional experience

Research Interests: lensing, dynamics and indirect detection of dark matter, dark energy, hydrodynamical simulations of galaxy formation, star formation and associated feedback processes in the interstellar medium, numerical methods, visualization tools.

- **Postdoctoral positions :**

- 2007- ...: ANR fellowship, Institut d'Astrophysique de Paris, with C. Alard.
- 2006-2007: PPARC fellowship, Oxford University, with Prof. Silk.

- **Ph.D (2002-2005) :**

- in Astrophysics at Université de Nice-Sophia-Antipolis, MENRT Fellowship.
- **Subject:** "Dynamical and physical aspects of dark matter"
- **Advisor:** J.A. de Freitas Pacheco.
- **01/2004 - 04/2004 :** visit Oxford University (Marie Curie Fellowship) with Prof. Silk.

- **Other degrees :**

- **2001-2002:** "DEA" of Astronomy : Imaging, High Angular Resolution and Gravitation, Université de Nice-Sophia-Antipolis, France
- **2000-2001:** M.S. in Physics, Université de Nice-Sophia-Antipolis, France

- 1999-2000: B.S. in Physics, Université de Nice-Sophia-Antipolis, France

Languages

- FRENCH : mother tongue.
- ANGLAIS : fluent.
- ESPAGNOL : good school knowledge.

Teaching

- 2006-2007 : Tutor for 4th Year Astrophysics classes (18 h).
- 2006-2007 : Demonstrator in computing (c language) for 2nd 3rd Year classes (48 h).

Memberships

- Since 2004, I'm a member of the [Horizon project](#).

Computer skills

- SYSTEMS : Windows, Linux.
- SOFTWARES : Word, PowerPoint, Latex.
- LANGUAGES : C, C++, Fortran90, HTML.

Refereed publications list

10. *"Numerical investigation of lenses with substructures using the perturbative method"*
S. Peirani, C. Alard, C. Pichon, R. Gavazzi and D. Aubert
 2008, submitted to MNRAS
9. *"The role of minor mergers in the recent star formation history of early-type galaxies"*
 S. Kaviraj, **S. Peirani**, S. Khochfar, J. Silk and S. Kay
 2008, submitted to MNRAS

8. *"Dark Matter Accretion into Supermassive Black Holes"*
S. Peirani and J.A. de Freitas Pacheco
 2008, Phys.Rev.D, 77, 064023

7. *"Active Galactic Nuclei and Massive Galaxy Cores"*
S. Peirani, S. Kay and J. Silk
 2008, A&A 479,123

6. *"Evolution of the Phase-Space Density of Dark Matter Halos and Mixing Effects in Merger Events"*
S. Peirani, F. Durier and J. A. de Freitas Pacheco
 2006, MNRAS, 367, 1011

5. *"Mass determination of groups of galaxies: Effects of the cosmological constant"*
S. Peirani and J. A. de Freitas Pacheco
 2006, New Astronomy, 11, 325

4. *"Dark Matter: indirect detection"*
 J. A. de Freitas Pacheco and **S. Peirani**
 2005, Gravitation and Cosmology, v. 11, N 1-2 (41-42), pp. 169-176 (2005)

3. *"Indirect search for dark matter : prospects for GLAST"*
S. Peirani, R. Mohayaee and J. A. de Freitas Pacheco
 2004, Phys.Rev. D, 70, 043503

2. *"Dark matter in the Universe"*
 J. A. de Freitas Pacheco and **S. Peirani**
 2004, International Journal of Modern Physics D [Gravitation; Astrophysics and Cosmology], Vol. 13, No. 7, 1335-1344

1. *"The angular momentum of dark halos : merger and accretion effects"*
S. Peirani, R. Mohayaee and J. A. de Freitas Pacheco
 2004, MNRAS, 348..921

I was born in Rome, in 12/12/1981.

Maturita' scientifica, Liceo A. Righi di Roma, 96/100; 2000.

Master Degree University of Rome "La Sapienza", 110/110 cum laude, 16/7/2005

Ph.D fellowship in the IRAP Ph.D. Program, from 1/11/2005

Seminars, schools and international meetings followed:

- First Bego Scientific Rencontre 5-16 February 2006.
- 1 month in Paris for the school: Gravitational Waves, Relativistic Astrophysics and Cosmology, 1 November-4 December 2006; organizer T. Damour, N. DeRuelle
- I Cesare Lattes Meeting on GRBs, Black Holes and Neutron Stars, Rio de Janeiro, February 25-3 March 2007
- 10th Italian-Korean Symposium on Relativistic Astrophysics, June 25 - 30 2007, Pescara
- 4th Italian-Sino Workshop on Relativistic Astrophysics, July 20 - 30 2007, Pescara, Italy
- II Stueckelberg Workshop, 3-8 September, Pescara

Last talks delivered:

- "Some features of a new 2-soliton solution of the Einstein-Maxwell equations", at the MGM XI, 2006.
- "The fields of a naked singularity and black hole in mutual equilibrium " at the 4th Italian-Sino Workshop
- "Electric force lines of the double Reissner-Nordstrom solution" at the II Stueckelberg Workshop

Personal works:

- "Gravitational field and electric force lines of a new 2-soliton solution", IJMPD Vol. 16, No. 6 (2007) 1087-1108
- "Electrical force lines of a 2-soliton solution of the Einstein-Maxwell Equations", proceeding of the XI MGM
- "The fields of a naked singularity and a black hole in mutual equilibrium", (with A. Paolino) proceeding of the 4th Italian-Sino Workshop
- "Electric Force Lines of the double Reissner-Nordstrom exact solution", (with A. Paolino) to be published

Works in Progress:

We are working (with prof. Belinski) on the problem of the model of the Reissner-Nordstrom metric as a thin charged shell with tangential pressure. In particular we have

found the equation of state needed to have a static shell, and we are now working on the stability conditions.

We are working also on the quasiclassical tunneling on the Schwarzschild metric (in relation with the “Hawking radiation” problem). In particular we want to show some problems encountered by some procedure appeared recently in literature, which makes the use of the Painleve coordinates.

However my interests span on all the theoretical aspects of General Relativity, from the classical cosmological models to the modern approach to gravity attempted by Quantum Loop Gravity and the experimental problems linked to it.

I have also a basic knowledge of Statistical Mechanics and Quantum Field Theory.

Marco Pizzi

Primorac Daria

Position: IRAP PhD student

Period covered: January 2016 - December 2018



I Scientific Work

Gamma-Ray Bursts: Population studies, multi-wavelength data analysis. Formerly, X-ray observational properties of AGNs and compact objects.

II Conferences and educational activities

II a Conferences and Other External Scientific Work

- *Speaker at the 13th International Conference on Gravitation, Astrophysics, and Cosmology - 15th Italian-Korean Symposium on Relativistic Astrophysics, July 03 2017 - July 07 2017, Ewha Womans University, Seoul, Korea. Title of the talk: "GRB 110731A within the IGC paradigm".*
- *Speaker at the 2017 Annual meeting of the Division of Gravitation and Relativistic Astrophysics of the Chinese Physical Society / Fifth Galileo-Xu Guangqai Meeting, June 25 2017 – June 30 2017, Chengdu, China. Title of the talk: "GRB 110731A within the IGC paradigm".*
- *Attended the Supernovae, Hypernovae and Binary Driven Hypernovae, an Adriatic Meeting, 20.6.2016 - 30.6.2016, International Center for Relativistic Astrophysics, ICRANet headquarters, Pescara, Italy*
- *Attended the 4th Bego Recontres - IRAP Ph.D Erasmus Mundus school, 30.5.2016 - 3.6.2016 , Nice, France*
- *Attended the Thermoelectric workshop on new thermoelectric materials, 28.09-2.10.2013, Split, Croatia <http://thermoelectrics2013.ifs.hr/program/>*

2017 List of Publication

Regular articles

- R. Ruffini et al., "Early X-Ray Flares in GRBs", The Astrophysical Journal, 852, 53 (2018).
- Y. Aimuratov et al., "GRB 081024B and GRB 140402A: Two Additional Short GRBs from Binary Neutron Star Mergers", The Astrophysical Journal, 844, 83 (2017).

- R. Ruffini et al., “The cosmic matrix in the 50th anniversary of relativistic astrophysics”, International Journal of Modern Physics D, Volume 26, Issue 10 (2017).
- J. A. Rueda et al., “The binary systems associated with short and long gamma-ray bursts and their detectability”, International Journal of Modern Physics D, Volume 26, Issue 09 (2017).

Proceedings

- D. Primorac et al., “GRB 110731A within the IGC paradigm”, Joint International Conference of ICGAC-XIII and IK-15 on Gravitation, Astrophysics and Cosmology, EPJ Web of Conferences 168, 04008 (2018).
- M. Muccino et al., “What can we learn from GRBs?”, Joint International Conference of ICGAC-XIII and IK-15 on Gravitation, Astrophysics and Cosmology, EPJ Web of Conferences 168, 01015 (2018).
- J. D. Melon Fuksman et al., “Evolution of an electron-positron plasma produced by induced gravitational collapse in binary-driven hypernovae”, Joint International Conference of ICGAC-XIII and IK-15 on Gravitation, Astrophysics and Cosmology, EPJ Web of Conferences 168, 04009 (2018).
- G. B. Pisani et al., “The first ICRANet catalog of binary-driven hypernovae”, Joint International Conference of ICGAC-XIII and IK-15 on Gravitation, Astrophysics and Cosmology, EPJ Web of Conferences 168, 04002 (2018).
- J. Rueda et al., “The binary systems associated with short and long gamma-ray bursts and their detectability”, Proceedings of the MG14 Meeting on General Relativity, ISBN: 978-981-3226-59-3 (2017).
- R. Ruffini et al., “The cosmic matrix in the 50th anniversary of relativistic astrophysics”, Proceedings of the MG14 Meeting on General Relativity, ISBN: 978-981-3226-59-3 (2017).

Curriculum

Daniela Pugliese

“Sapienza” University of Rome (G9) Piazzale Aldo Moro 5
00185 Roma

ICRA - International Center for Relativistic Astrophysics
Physics Department

Telephone: (0039) 06 4991 4299
E-mail: daniela.pugliese@ICRA.it

July 2010

PERSONAL DATA

Date of birth: March 02, 1982, Naples Italy.

Citizenship: Italian.

E-mail: daniela.pugliese@alice.it

CURRENT POSITION

2007-2010

International Relativistic Astrophysics Ph.D. Program ([IRAP PhD](#))
(VI Cycle IRAP- XXIII Cycle “Sapienza”).

EDUCATION

October 2007: *Department of Physics and ICRA (International Center for Relativistic Astrophysics), University of Rome “La Sapienza”, Italy*, admission to the International Relativistic Astrophysics Ph.D. Program (IRAP PHD) with a fellowship (2007-2010).

July 2007 *Physics Department University of Naples “Federico II”, Italy*.
Master Degree in Physics, grade: 110/110 cum laude.
Supervisors: Prof. S. Capozziello , Dr. C.Stornaiolo.
Title of the thesis “Deformazioni di metriche spazio-temporali”.

2002-2005 Physics Department University of Naples “Federico II”, Italy.

Qualifying exams

Fisica della Gravitazione Modulo A (- prof G. Bimonte, Dr C.Stornaiolo)

Teoria Quantistica dei Campi (prof .P. Santorelli, prof .S. Capiello)

Teoria dei Campi Modulo A (prof . G. Marmo)

Relatività (prof .R. Pettorino)

Meccanica Statistica (prof .A. Coniglio)

July 2000 *Scientific High School “Ettore Majorana” of Pozzuoli, in Bacoli (NA), Italy*
Scientific High School Diploma, grade: 100/100.

COMPUTER SKILLS

Operating Systems: Windows (very good), Linux (very good).

Data Analysis: Excel (fair).

Typesetting and Presentations: LaTeX(very good), OpenOffice.org (very good), Microsoft Office (very good).

Computational task: Mathematica (very good). Maple (good)

LANGUAGES

Italian: Native language.

English: Spoken (good); written (good); listening comprehension (good)

French: Spoken (Little); written (good); listening comprehension (fair)

COURSES

December 2007-July 2008 :

- Fisica gravitazionale II by Prof. R. Ruffini
- Fisica teorica II: relatività generale, cosmologia, collasso gravitazionale by Prof. R. Ruffini
- Fisica teorica III: buchi neri, polarizzazione del vuoto, Big Bang e cosmologia by Prof. R. Ruffini
- Fisica teorica: meccanica analitica by Prof G. Gallavotti
- Cosmologia primordiale by Dr G. Montani

February 2010 :

- IRAP Ph.D. Lectures Nice Observatoire de la Cote D'Azur
by J. Einasto , S. Chakrabarti, R. Manchester, A. Melchiorri, G. Vereshchagin, A. Morbidelli, T. Regimbau, Y. Rabbia, A. Aksenov

MEETINGS AND SCHOOLS

February 2008

- *"Second Kolkata Conference on Observational Evidence for Black Holes in the Universe"*
and

- *"SNBNCBS-ICRANet workshop on Black Holes, Neutron Stars and Gamma Ray Bursts", February 10th-17th 2008, Kolkata.*

July-August 2008

- *"Third Stuckelberg Workshop", July 8-18 (2008), Pescara, Italy.*
- *"XIII Brazilian school of cosmology and gravitation", 24 July-02 August (2008) Mangaratiba Rio de Janeiro Brazil*

September 2008

- *"Probing stellar populations out to the distant Universe" 14-19 September, 2008 Cefalù Sicily*

November 2008

- *"3th Meeting of the Scientific Committee of ICRANet" November 19-20, 2008*

July 2009

- *"2nd Italian-Pakistani Workshop on Relativistic Astrophysics" July 8-10, 2009 - Pescara, Italy*
- *"12th Marcel Grossman Meeting MG12" Paris July 12-18, 2009*

December 2009

- *"4th Meeting of the Scientific Committee of ICRANet" November 14-15, 2009*

July 2010

- *"2nd Galileo-Xu Guangqi Meeting" 12-17 July 2010 Hanbury Botanic Gardens – Ventimiglia (Italy)*

RESEARCH INTERESTS

·General Relativity. Quantum field theory. Multidimensional theories.

PROFESSIONAL MEMBERSHIPS

- 2007-present International Center for Relativistic Astrophysics (ICRA)
- 2007- present International Center for Relativistic Astrophysics Network (ICRANet).
- 2008-present American Physical Society (APS).
- 2010- Società Italiana di Fisica (Italian Physical Society (SIF)).

Hobbies and other experiences

Reading, music (classical music, opera, blues, jazz and traditional music), domino, flute.

Curriculum Juracy Lemos

Personal Data

Full Name	Rangel Lemos, Luis Juracy
Place, date of birth	Maturin–Venezuela, 27 March of 1980
Nationality	Brazilian
Sex, Marital Status	Male, Single

Education

2006–2009	<i>PhD in Relativistic Astrophysics</i> , International Center for Relativistic Astrophysics, University of Rome “La Sapienza”, Rome–Italy Second Year
2004–2006	<i>Master in Astronomy</i> , Valongo Observatory/Federal University of Rio de Janeiro, Rio de Janeiro–RJ–Brazil
1999–2003	<i>Physicist</i> , Physical Departament/Federal University of São Carlos, São Carlos–SP–Brazil

Languages

Native	Portuguese
Spanish	Spoken (very good), listening comprehension (very good), written (very good)
Italian	Spoken (good), listening comprehension (very good), written (good)
English	Spoken (good), listening comprehension (good), written (good)

Computing Skills

Programming Languages	Fortran (77)	Numerical Methods in Physics
Plotting Engines	Gnuplot	Visualization of mathematical functions and data

Speaker and Posters

- July 2007 *Fermi's approach to the study of hadronic interactions*, Italian-Sino Workshop on Relativistic Astrophysics, Pescara-Italy
- February 2006 *Spatial and observational homogeneities of the galaxy distribution*, IV Workshop New Physic in the Space, Campos do Jordão-SP-Brazil

Publications in Proceedings of Meetings and Workshops

- 2007 *Fermi's approach to the study of hadronic interactions*, L.J. Rangel Lemos, Sabrina Casanova, S. Kelner and Remo Ruffini, Italian-Sino Workshop on Relativistic Astrophysics, July, Pescara-Italy. To be published in the American Institute of Physics-Conference Proceedings.

Meetings, Courses and Workshops

- September 2007 IX National School of Astrophysics, Venice-Italy.
- July 2007 IV Italian-Sino Workshop on Relativistic Astrophysics, Pescara-Italy.
- June 2007 X Italian-Korean Symposium on Relativistic Astrophysics, Pescara-Italy.
- February 2007 Cesare Lattes Meeting on GRB's, Black Holes and Supernovae, Rio de Janeiro-RJ-Brazil.
- November 2006 Courses and Workshops on Gravitational Waves, Relativistic Astrophysics and Cosmology - Emile Borel Center/IHP, Paris-France.
- February 2006 IV Workshop New Physic in the Space, Campos do Jordão-SP-Brazil.
- October 2005 II School of Fundamental Interactions/DF-UFES, Vitória-ES-Brazil.
- September 2005 First INPE Advanced Course, São José dos Campos-SP-Brazil.
- August 2005 100 Years of Relativity International Conference, São Paulo-SP-Brazil.
- July 2004 XXV Brazilian Meeting of Particles Physics and Fields, Caxambu-MG-Brazil.
- August 2004 XXX Annually Meeting of Brazilian Astronomical Society, Águas de São Pedro-SP-Brazil.
- February 2004 Summer Course - IFUSP, São Paulo-SP-Brazil.

- August 2003 XIV Physical Winter School of UFMG, Belo Horizonte-MG-Brazil.
- July 2003 Extension Course - IFT/UNESP, São Paulo-SP-Brazil.
- July 2002 IV CBPF School, Rio de Janeiro-RJ-Brazil.
- July 2001 Extension Course - IFT/UNESP, São Paulo-SP-Brazil.
- February 2001 III CBPF School, Rio de Janeiro-RJ-Brazil.
- January 2001 Introduction Course of Astronomy and Astrophysics - IAG/USP, São Paulo-SP-Brazil.
- July 2000 Introduction Course of Astronomy and Astrophysics - INPE, São José dos Campos-SP-Brazil.
- July 2000 LII Annually Meeting of SBPC, Brasília-DF-Brazil.
- July 2000 V Brazilian Meeting of PET's Groups (ENAPET), Brasília-DF-Brazil.

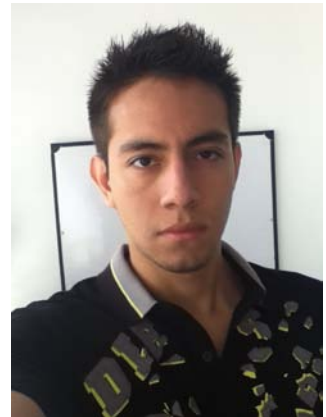
Collaborations works

- August 2007 Study of hadronic interactions with the Prof. Felix Aharonian - Max Planck Institute of Nuclear Physics (MPIK), Heidelberg-Germany.

Rodriguez Ruiz Jose Fernando

Position: PhD Student

Period covered: 2015-2018



I Scientific Work

II Conferences and educational activities

Conference on Cosmology Gravitational Waves and Particles

February 2017

Gravitational Wave Emission of Short and Long Gamma Ray Bursts

Fifth Galileo-Xu Guangqi Meeting

June 2017

Strong-field gravitational-wave emission in Schwarzschild and Kerr geometries: some general considerations

3th International Conference on Gravitation, Astrophysics, and Cosmology

15th Italian-Korean Symposium on Relativistic Astrophysics

A Joint Meeting

July 2017

Strong-field gravitational-wave emission in Schwarzschild and Kerr geometries: some general considerations

2017 List of Publication

J.F. Rodríguez, J.A. Rueda and R. Ruffini *Strong-field gravitational-wave emission in Schwarzschild and Kerr geometries: some general considerations* European Physical Journal Web of Conferences, 168, 02006, 2017

Rotondo Michael

Position: Post-doctoral researcher
Period covered: 2011-2012



I Scientific Work

Supercritical electric fields in nuclei and neutron stars
Electrodynamical properties of white dwarfs and neutron stars

II Conferences and educational activities

II a Conferences and Other External Scientific Work

- 1) Italian-Korean Symposium on Relativistic Astrophysics, 4-8 July 2011, Pescara (Italy): participant with the talk *The relativistic Feynman-Metropolis-Teller treatment for finite temperatures*.
- 2) IRAP Ph.D. and Erasmus Mundus Workshop: Recent news from MeV, GeV and TeV gamma rays domain: results and interpretations, 21-26 March 2011, Pescara (Italy): participant with the talk *From atoms to nuclear matter cores of stellar dimensions: a unified approach based on the relativistic Thomas-Fermi model*.

II B Other Teaching Duties

Teacher assistant of the course "Collasso gravitazionale, buchi neri, polarizzazione del vuoto e cosmologia" held by Prof. Remo Ruffini at Physics Department of the University "Sapienza", Rome, Italy, academic year 2010/2011.

Member of the examining committee chaired by Prof. Remo Ruffini at Physics Department of the University "Sapienza", Rome, Italy, academic year 2010/2011.

2011-2012 List of Publication

- 1) Rotondo M., Rueda J. A., Ruffini R. and S.-S. Xue, *The relativistic Thomas-Fermi treatment for compressed atoms at finite temperatures*, accepted for publication in *Il Nuovo Cimento C*, 2012.
- 2) Rotondo M., Rueda J. A., Ruffini R. and S.-S. Xue, *On degenerate compressed atoms and compressed nuclear matter cores of stellar dimensions*, in *Proceedings of the second Galileo-Xu Guangqi meeting, IJMPD*, Vol.12, 203-212, 2012.
- 3) Rotondo M., Rueda J. A., Ruffini R., Xue S.-S., *From compressed atoms to compressed massive nuclear density cores*, in the *Proceedings of the twelfth Marcel Grossmann meeting*, T. Damour, R. Janzen, R. Ruffini (eds.), World Scientific, p.1036, 2012.
- 4) Boskhaev K., Rotondo M. and Ruffini R., *On magnetic fields on rotating nuclear matter cores of stellar dimensions*, in *Proceedings of the Galileo-Xu Guangqi meeting, IJMPD*, Vol. 12, 58-67, 2012.
- 5) Boskhaev K., Rotondo M., Ruffini R., *On Nuclear Matter Cores and Their Applications*, in *Advances in Computational Astrophysics: Methods, Tools and Outcomes*, R. Capuzzo-Dolcetta, M. Limongi, A. Tornambè (eds.), Astronomical Society of Pacific, Vol. 453, p. 347, 2012.

- 6) Rueda J. A., Rotondo M., Ruffini R., Xue S.-S., *A new family of neutron star models: global neutrality versus local neutrality*, in the Proceedings of the twelfth Marcel Grossmann meeting, T. Damour, R. Janzen, R. Ruffini (eds.), World Scientific, p.1039, 2012
- 7) Rotondo M., Rueda J. A., Ruffini R., Xue S.-S., *Phys. Rev. D, Relativistic Feynman-Metropolis-Teller theory for white dwarfs in general relativity.*, Vol. 84, 084007, 2011
- 8) Rotondo M., Rueda J. A., Ruffini R., Xue S.-S., *Phys. Lett. B, The self-consistent general relativistic solution for a system of neutron, protons and electrons in beta equilibrium*, Vol. 701, 667, 2011.
- 9) Rotondo M., Rueda J. A., Ruffini R., Xue S.-S., *Phys. Rev. C, On the relativistic Thomas-Fermi treatment of compressed atoms and compressed nuclear matter cores of stellar dimensions*, Vol. 83, 045805, 2011.

Rueda Hernández, Jorge Armando

Position:

Faculty Professor at ICRANet

Member of ICRANet Faculty

IRAP PhD Faculty

Period covered: 2011-Present



I Scientific Work

I perform research in the following topics:

- Nuclear and atomic astrophysics.
- Physics and astrophysics of white dwarfs and neutron stars.
- Radiation mechanisms of white dwarfs and neutron stars.
- Gamma-ray bursts theory.
- Accretion disks, hypercritical accretion processes.
- Neutrino emission from astrophysical sources.
- Gravitational waves.
- Exact solutions of the Einstein and Einstein-Maxwell equations in astrophysics.
- Critical electromagnetic fields and non-linear electrodynamics effects in astrophysics.
- Distribution of dark matter in galaxies and cosmological implications.

II Conferences and educational activities

II a Conferences and Other External Scientific Work

In the year 2017 I presented lectures/talks in the following conferences/meetings/workshops:

- “Fifth Bego Rencontre”, IRAP Ph.D. Erasmus Mundus School, 15-19 May 2017, Nice (France).
- “The 2017 Annual meeting of the Division of Gravitation and Relativistic Astrophysics of the Chinese Physical Society”, 25-30 June 2017, Chengdu (China).
- “The Fifth Galileo-Xu Guangqi Meeting”, 25-30 June 2017, Chengdu (China).
- “XIII International Conference on Gravitation, Astrophysics and Cosmology”, 3-7 July 2017, Seoul (South Korea).
- “15th Italian-Korean Symposium on Relativistic Astrophysics”, 3-7 July 2017, Seoul (South Korea).
- “Vida después de la muerte: Estrellas de neutrones y las explosiones más potentes del Universo”, Invited Talk for the High School Instituto Antonino Nariño, 12 September 2017, Barrancabermeja (Colombia)

- “9th European Summer School on Experimental Nuclear Astrophysics”, 17-24 September 2017, Santa Tecla (Italy).
- “La notte europea dei ricercatori”, 29 September 2017, Pescara (Italy).
- “Theseus Workshop”, 5-6 October 2017, Naples (Italy).
- “¿Hacia dónde va la astronomía y la astrofísica en Colombia?”, Invited Talk at the 50th anniversary of the Physics Department of Universidad Industrial de Santander, 20 October 2017, Bucaramanga (Colombia).

II b Work With Students

- Current scientific collaboration with the following students of the IRAP-PhD program at Sapienza University of Rome, Italy: Yerlan Aimuratov, Laura Becerra, Stefano Campion, Milos Kovacevic, David Melon Fuksman, Jose Fernando Rodriguez, Juan David Uribe, Ronaldo Vieira Lobato, Yu Wang.

II c Diploma thesis supervision

I list below the undergraduate theses which I have supervised.

- Undergraduate Thesis of Davide Gizzi 2016, Sapienza University of Rome, Italy: “Gravitational wave emission of compact object binary mergers within the effective one-body formalism”

Scientific Production:

- R. Ruffini, J. F. Rodriguez, M. Muccino, J. A. Rueda, et al., “On the rate and on the gravitational wave emission of short and long GRBs”, arXiv:1602.03545.

- Undergraduate Physics thesis of Silvia Petroni 2016, Sapienza University of Rome, Italy: “Hypercritical neutrino-collided accretion onto black holes”.

I list below the PhD theses which I have supervised and the ones currently under my supervision. They are distributed in the seven topics listed above in the section I. I also include some scientific production that derived from these PhD researches.

- PhD thesis of Juan David Uribe 2015-2018, Sapienza University of Rome, Italy. Topics: 1-4. Fellowship: IRAP-PhD

Scientific Production:

- L. Becerra, M. Guzzo, F. Rossi-Torres, J. A. Rueda, R. Ruffini, J. D. Uribe, “Neutrino Oscillations within the Induced Gravitational Collapse Paradigm of Long Gamma-Ray Bursts”, The Astrophysical Journal 852, 120 (2018).

- PhD thesis of Jose Fernando Rodriguez Ruiz 2014-2017, Sapienza University of Rome, Italy. Topics: 1-4. Fellowship: IRAP-PhD

Scientific Production:

- J. F. Rodriguez, J. A. Rueda, and R. Ruffini, “Comparison and contrast of test-particle and numerical-relativity waveform templates”, submitted to JCAP; arXiv:1706.07704

- J. F. Rodriguez, J. A. Rueda, and R. Ruffini, “Strong-field gravitational-wave emission in Schwarzschild and Kerr geometries: some general considerations”, submitted to Phys. Rev. D; arXiv:1706.06440
- R. Ruffini, J. F. Rodriguez, M. Muccino, J. A. Rueda, et al., “On the rate and on the gravitational wave emission of short and long GRBs”, submitted to ApJ, arXiv:1602.03545.

- *PhD thesis of Laura Becerra Bayona 2013-2016, Sapienza University of Rome, Italy. Topics: 1-4. Fellowship: IRAP-PhD*

Scientific Production:

- L. Becerra, M. Guzzo, F. Rossi-Torres, J. A. Rueda, R. Ruffini, J. D. Uribe, “Neutrino Oscillations within the Induced Gravitational Collapse Paradigm of Long Gamma-Ray Bursts”, ApJ 852, 120 (2018).
- R. Ruffini, J. F. Rodriguez, M. Muccino, J. A. Rueda, et al., “On the rate and on the gravitational wave emission of short and long GRBs”, submitted to ApJ; arXiv:1602.03545.
- L. Becerra, J. A. Rueda, P. Lorén-Aguilar, E. García-Berro, “The Spin Evolution of Fast-Rotating, Magnetized Super-Chandrasekhar White Dwarfs in the Aftermath of White Dwarf Mergers”, submitted to ApJ.
- R. Ruffini, J. A. Rueda, M. Muccino, Y. Aimuratov, L. M. Becerra, et al., “On the classification of GRBs and their occurrence rates,” ApJ 832, 136 (2016).
- L. Becerra, C. L. Bianco, C. L. Fryer, J. A. Rueda, and R. Ruffini, “On the induced gravitational collapse scenario of gamma-ray bursts associated with supernovae”, ApJ 833, 107 (2016).
- L. Becerra, F. Cipolletta, C. L. Fryer, J. A. Rueda, and R. Ruffini, “Angular Momentum Role in the Hypercritical Accretion of Binary-driven Hypernovae”, ApJ 812, 100 (2015).

- *PhD thesis of Luis Gabriel Gómez 2013-2016, Sapienza University of Rome, Italy and University of Nice Sophia-Antipolis, Nice, France. Topics: 7. Fellowship: Erasmus Mundus IRAP-PhD*

Scientific Production:

- L. G. Gomez and J. A. Rueda, “Dark-matter dynamical friction versus gravitational-wave emission in the evolution of compact-star binaries”, Phys. Rev. D 96, 063001 (2017).
- L. G. Gomez, C. R. Argüelles, P. Volker, J. A. Rueda, R. Ruffini, “Strong lensing by fermionic dark matter in galaxies”, Phys. Rev. D 94, 123004 (2016).
- L. G. Gomez and J. A. Rueda, “The Role of the Dark Matter Distribution in the Structure Formation”, Proc. Second César Lattes Meeting 2016.

- *PhD thesis of Fernanda Gomes Oliveira 2012-2015, Sapienza University of Rome, Italy and University of Nice Sophia-Antipolis, Nice, France. Topics: 2-4. Fellowship: Erasmus Mundus IRAP-PhD*

Scientific Production:

- C. L. Fryer, F. G. Oliveira, J. A. Rueda, and R. Ruffini, “Neutron-Star-Black-Hole Binaries Produced by Binary-Driven Hypernovae”, Phys. Rev. Lett., vol. 115, p. 231102, Dec. 2015.

- R. Ruffini, M. Muccino, M. Kovacevic, F. G. Oliveira, J. A. Rueda, C. L. Bianco, M. Enderli, A. V. Penacchioni, G. B. Pisani, Y. Wang, and E. Zaninoni, “GRB 140619B: a short GRB from a binary neutron star merger leading to black hole formation”, *ApJ*, vol. 808, p. 190, Aug. 2015.
- F. G. Oliveira, J. A. Rueda, and R. Ruffini, “X, Gamma-Rays, and Gravitational Waves Emission in a Short Gamma-Ray Burst” *Astrophysics and Space Science Proceedings*, vol. 40, p. 43, 2015.
- F. G. Oliveira, J. A. Rueda, and R. Ruffini, “Gravitational Waves versus X-Ray and Gamma-Ray Emission in a Short Gamma-Ray Burst”, *ApJ*, vol. 787, p. 150, June 2014.

- *PhD thesis of Diego Leonardo Cáceres Uribe 2011-2014, Sapienza University of Rome, Italy. Topics: 2 and 4. Fellowship: IRAP-PhD*

Scientific Production:

- D. L. Cáceres, S. M. de Carvalho, J. G. Coelho, R. C. R. de Lima, J. A. Rueda, “Thermal X-ray emission from massive, fast rotating, highly magnetized white dwarfs”, *MNRAS* 465, 4434 (2017).
- Jaziel G. Coelho, D. L. Cáceres, R. C. R. de Lima, M. Malheiro, J. A. Rueda, R. Ruffini “The rotation-powered nature of some SGRs and AXPs”, *A&A* 599, A87 (2017).
- J. G. Coelho, R. M. Marinho, M. Malheiro, R. Negreiros, D. L. Cáceres, J. A. Rueda, and R. Ruffini, “Dynamical Instability of White Dwarfs and Breaking of Spherical Symmetry Under the Presence of Extreme Magnetic Fields”, *ApJ* 794, 86 (2014).
- D. L. Cáceres, J. A. Rueda, and R. Ruffini, “On the stability of ultra-magnetized white dwarfs”, *Journal of Korean Physical Society* 65, 846 (2014).

- *PhD thesis of Jonas Pedro Pereira’s PhD 2011-2014, Sapienza University of Rome, Italy and University of Nice Sophia-Antipolis, Nice, France. Topics: 3 and 6. Fellowship: Erasmus Mundus IRAP-PhD*

Scientific Production:

- J. P. Pereira and J. A. Rueda, “Energy decomposition within Einstein-Born-Infeld black holes”, *Phys. Rev. D*, vol. 91, p. 064048, Mar. 2015.
- J. P. Pereira and J. A. Rueda, “Radial Stability in Stratified Stars”, *ApJ*, vol. 801, p. 19, Mar. 2015.
- J. P. Pereira, J. G. Coelho, and J. A. Rueda, “Stability of thin-shell interfaces inside compact stars”, *Phys. Rev. D*, vol. 90, p. 123011, Dec. 2014.
- J. P. Pereira, H. J. Mosquera Cuesta, J. A. Rueda, and R. Ruffini, “On the black hole mass decomposition in nonlinear electrodynamics”, *Physics Letters B*, vol. 734, pp. 396-402, June 2014.

- *PhD thesis of Carlos Raul Arguelles 2011-2014, Sapienza University of Rome, Italy. Topics: 7. Fellowship: IRAP-PhD*

Scientific Production:

- C. R. Arguelles, J. A. Rueda, and R. Ruffini, “Theoretical evidence of 50 keV fermionic dark matter from galactic observables”, submitted; arXiv:1606.07040.

- C. R. Argüelles, N. E. Mavromatos, J. A. Rueda, and R. Ruffini, “The role of self-interacting right-handed neutrinos in galactic structure,” JCAP, vol. 4, p. 038, Apr. 2016.
- R. Ruffini, C. R. Argüelles, and J. A. Rueda, “On the core-halo distribution of dark matter in galaxies,” MNRAS, vol. 451, pp. 622-628, July 2015.
- R. Ruffini, C. R. Argüelles, B. M. O. Fraga, A. Geralico, H. Quevedo, J. A. Rueda, and I. Siutsou, “Black Holes in Gamma Ray Bursts and Galactic Nuclei”, International Journal of Modern Physics D, vol. 22, p. 60008, Sept. 2013.

- *PhD thesis of Sheyse Martins de Carvalho 2010-2013, Sapienza University of Rome, Italy and University of Nice Sophia-Antipolis, Nice, France. Topics: 1-3. Fellowship: Erasmus Mundus IRAP-PhD*

Scientific Production:

- S. M. de Carvalho, J. A. Rueda, and R. Ruffini, “On the Relativistic Feynman-Metropolis Equation of State at Finite Temperatures”, Proc. Thirteenth Marcel Grossmann Meeting, pp. 2481-2483, Jan. 2015.
- S. M. de Carvalho, R. Negreiros, J. A. Rueda, and R. Ruffini, “Thermal evolution of neutron stars with global and local neutrality”, Phys. Rev. C, vol. 90, p. 055804, Nov. 2014.
- S. M. de Carvalho, J. A. Rueda, and R. Ruffini, “On the cooling of globally-neutral neutron stars”, Journal of Korean Physical Society, vol. 65, pp. 861-864, Sept. 2014.
- S. M. de Carvalho, M. Rotondo, J. A. Rueda, and R. Ruffini, “Relativistic Feynman-Metropolis-Teller treatment at finite temperatures”, Phys. Rev. C, vol. 89, p. 015801, Jan. 2014.
- S. M. de Carvalho, J. A. Rueda, M. Rotondo, C. Argüelles, and R. Ruffini, “The Relativistic Feynman Metropolis Teller Theory at Zero and Finite Temperatures”, International Journal of Modern Physics Conference Series, vol. 23, pp. 244-247, Jan. 2013.

- *PhD thesis of Riccardo Belvedere 2008-2013, Sapienza University of Rome, Italy. Topics: 1, 3-4. Fellowship: IRAP-PhD*

Scientific Production:

- R. Belvedere, J. A. Rueda, and R. Ruffini, “On the Magnetic Field of Pulsars with Realistic Neutron Star Configurations”, ApJ, vol. 799, p. 23, Jan. 2015.
- R. Belvedere, J. A. Rueda, and R. Ruffini, “Static and rotating neutron stars fulfilling all fundamental interactions”, Journal of Korean Physical Society, vol. 65, pp. 897-902, Sept. 2014.
- R. Belvedere, K. Boshkayev, J. A. Rueda, and R. Ruffini, “Uniformly rotating neutron stars in the global and local charge neutrality cases”, Nuclear Physics A, vol. 921, pp. 33-59, Jan. 2014.
- R. Belvedere, J. A. Rueda, and R. Ruffini, “Neutron Star Cores in the General Relativistic Thomas-Fermi Treatment”, International Journal of Modern Physics Conference Series, vol. 23, pp. 185-192, Jan. 2013.
- R. Belvedere, D. Pugliese, J. A. Rueda, R. Ruffini, and S.-S. Xue, “Neutron star equilibrium configurations within a fully relativistic theory with strong, weak, electromagnetic, and gravitational interactions”, Nuclear Physics A, vol. 883, pp. 1-24, June 2012.
- R. Belvedere, J. Rueda, and R. Ruffini, “Mass, Radius and Moment of Inertia of Neutron Stars”, Proc. X-ray Astrophysics up to 511 keV, p. 7, Sept. 2011.

- R. Belvedere, J. A. Rueda, R. Ruffini, and S.-S. Xue, “The influence of the core on the structure of the outer crust of neutron stars”, Proc. 25th Texas Symposium on Relativistic Astrophysics, p. 270, 2010.

- *PhD thesis of Kuantay Boshkayev 2009-2012, Sapienza University of Rome, Italy. Topics: 2-5. Fellowship: IRAP-PhD*

- K. Boshkayev, J. Rueda, and M. Muccino, “Extracting multipole moments of neutron stars from quasi-periodic oscillations in low mass X-ray binaries”, Astronomy Reports, vol. 59, pp. 441-446, June 2015.
- K. Boshkayev, J. A. Rueda, R. Ruffini, and I. Siutsou, “General Relativistic and Newtonian White Dwarfs”, Proc. Thirteenth Marcel Grossmann Meeting, pp. 2468-2474, Jan. 2015.
- K. Boshkayev, J. A. Rueda, and R. Ruffini, “SGRs and AXPs as Massive Fast Rotating Highly Magnetized White Dwarfs: the case of SGR 0418+5729”, Prof. Thirteenth Marcel Grossmann Meeting, pp. 2295-2300, Jan. 2015.
- K. Boshkayev, D. Bini, J. Rueda, A. Geralico, M. Muccino, and I. Siutsou, “What can we extract from quasiperiodic oscillations?”, Gravitation and Cosmology, vol. 20, pp. 233-239, Oct. 2014.
- K. Boshkayev, J. A. Rueda, R. Ruffini, and I. Siutsou, “General relativistic white dwarfs and their astrophysical implications”, Journal of Korean Physical Society, vol. 65, pp. 855-860, Sept. 2014.
- R. Belvedere, K. Boshkayev, J. A. Rueda, and R. Ruffini, “Uniformly rotating neutron stars in the global and local charge neutrality cases”, Nuclear Physics A, vol. 921, pp. 33-59, Jan. 2014.
- J. A. Rueda, K. Boshkayev, L. Izzo, R. Ruffini, P. Loren-Aguilar, B. Kulebi, G. Aznar-Siguán, and E. Garcia-Berro, “A White Dwarf Merger as Progenitor of the Anomalous X-Ray Pulsar 4U 0142+61?”, ApJL, vol. 772, p. L24, Aug. 2013.
- K. Boshkayev, L. Izzo, J. A. Rueda, and R. Ruffini, “SGR 0418+5729, Swift J1822.3-1606, and 1E 2259+586 as massive, fast-rotating, highly magnetized white dwarfs”, A&A, vol. 555, p. A151, July 2013.
- K. Boshkayev, J. Rueda, and R. Ruffini, “On the Maximum Mass and Minimum Rotation Period of Relativistic Uniformly Rotating White Dwarfs”, International Journal of Modern Physics Conference Series, vol. 23, pp. 193-197, Jan. 2013.
- K. Boshkayev, J. A. Rueda, R. Ruffini, and I. Siutsou, “On General Relativistic Uniformly Rotating White Dwarfs”, ApJ, vol. 762, p. 117, Jan. 2013.
- K. Boshkayev, J. Rueda, and R. Ruffini, “On the Maximum Mass of General Relativistic Uniformly Rotating White Dwarfs”, International Journal of Modern Physics E, vol. 20, pp. 136-140, 2011.

II d Other Teaching Duties

In addition to the supervision of PhD theses, I teach in the IRAP PhD Program and in the Doctoral Schools organized within it. The topics of teaching are the ones in section I.

II e International Scientific Collaborations

I have active scientific collaborations with the following professors/researches:

- In Argentina: Carlos R. Argüelles at UNLP (La Plata).

- In Brazil: Ulisses Barres de Almeida and Sergio B. Duarte at CBPF (Rio de Janeiro); R. Negreiros at UFF (Niterói); Débora P. Menezes at UFSC (Florianópolis); S. O. Kepler and C. A. Z. Vasconcellos at UFRGS (Porto Alegre); R. Marinho Jr and M. Malheiro at ITA (São José dos Campos); Marcelo Guzzo and Fernando Torres at Unicamp (Campinas); Luis J. Rangel-Lemos and Sheyse M. de Carvalho at UFT (Palma); Rafael Rodrigues de Lima at UDESC (Florianópolis); Jonas P. Pereira at UFABC (Santo André); Jaziel G. Coelho at INPE (São José dos Campos).
- In Colombia: Luis Nuñez, Guillermo González and Fabio Lora Clavijo at UIS (Bucaramanga); Leonardo A. Pachón and Antonio Enea Romano at UdeA (Medellín); César A. Valenzuela at Univalle (Cali).
- In England: Nikolaos Mavromatos at King College London (London); Pablo Lorén-Aguilar at Exeter University (Exeter).
- In Germany: Volker Perlick at University of Bremen (Bremen).
- In Kazakhstan: Kuantay Boshkayev at Al-Farabi Kazakh National University (Almaty).
- In Mexico: Hernando Quevedo at UNAM (México D. F.).
- In Spain: Enrique García-Berro at UPC (Barcelona); Luis Herrera Cometta at University of Salamanca (Salamanca).
- In USA: Chris L. Fryer at LANL (New Mexico); G. Mathews at UND (South Bend).

II e. Work With Postdocs

-Riccardo Belvedere (CAPES-ICRANet Program Fellow at ICRANet - Rio de Janeiro and Universidade Federal Fluminense). Scientific collaboration in the topics 1 and 3.

Scientific Production:

- R. Belvedere, J. A. Rueda, and R. Ruffini, “On the Magnetic Field of Pulsars with Realistic Neutron Star Configurations”, *ApJ*, vol. 799, p. 23, Jan. 2015.
- R. Belvedere, K. Boshkayev, J. A. Rueda, and R. Ruffini, “Uniformly rotating neutron stars in the global and local charge neutrality cases”, *Nuclear Physics A*, vol. 921, pp. 33-59, Jan. 2014.

- Rafael Camargo Rodrigues de Lima (CAPES-ICRANet Program Fellow at ICRANet - Pescara). Scientific collaboration in the topics 1 and 3.

Scientific Production:

- D. L. Cáceres, S. M. de Carvalho, J. G. Coelho, R. C. R. de Lima, J. A. Rueda, “Thermal X-ray emission from massive, fast rotating, highly magnetized white dwarfs”, *MNRAS* 465, 4434 (2017).
- Jaziel G. Coelho, D. L. Cáceres, R. C. R. de Lima, M. Malheiro, J. A. Rueda, R. Ruffini “The rotation-powered nature of some SGRs and AXPs”, *A&A* 599, A87 (2017).

- Sheyse Martins de Carvalho (CAPES-ICRANet Program Fellow at ICRANet – Rio de Janeiro and Universidade Federal Fluminense). Scientific collaboration in the topics 1-3.

Scientific Production:

- D. L. Cáceres, S. M. de Carvalho, J. G. Coelho, R. C. R. de Lima, J. A. Rueda, “Thermal X-ray emission from massive, fast rotating, highly magnetized white dwarfs”, submitted.

- S. M. de Carvalho, R. Negreiros, J. A. Rueda, and R. Ruffini, “Thermal evolution of neutron stars with global and local neutrality”, Phys. Rev. C, vol. 90, p. 055804, Nov. 2014.

- **Jaziel Goulart Coelho (CAPES-ICRANet Program Fellow at ICRANet and Sapienza University of Rome). Scientific collaboration in the topics 1-3.**

Scientific Production:

- D. L. Caceres, S. M. de Carvalho, J. G. Coelho, R. C. R. de Lima, J. A. Rueda, “Thermal X-ray emission from massive, fast rotating, highly magnetized white dwarfs”, submitted.
- Jaziel G. Coelho, D. L. Caceres, R. C. R. de Lima, M. Malheiro, J. A. Rueda, R. Ruffini “On the nature of some SGRs and AXPs as rotation-powered neutron stars”, A&A, accepted.
- J. G. Coelho, R. M. Marinho, M. Malheiro, R. Negreiros, D. L. Caceres, J. A. Rueda, and R. Ruffini, “Dynamical Instability of White Dwarfs and Breaking of Spherical Symmetry Under the Presence of Extreme Magnetic Fields”, ApJ, vol. 794, p. 86, Oct. 2014.
- J. P. Pereira, J. G. Coelho, and J. A. Rueda, “Stability of thin-shell interfaces inside compact stars”, Phys. Rev. D, vol. 90, p. 123011, Dec. 2014.

III. Service activities [*activities carried out in collaboration with ICRANet (e.g. teaching activities, conferences etc...) and outside ICRANet (teaching activities in your university etc...)*]

III a. Within ICRANet

- Coordinator of the CAPES-ICRANet Program
- Member of the IRAP- PhD Faculty

III b. Outside ICRANet

Journal Referee:

- European Journal of Physics
- Astrophysics and Space Science Researches in Astronomy and Astrophysics
- Canadian Journal of Physics
- Advances and Space Research
- Mathematical Reviews of the American Mathematical Society
- General Relativity and Gravitation

Scientific Advisor and/or Project Evaluation

- National Center of Science and Technology Evaluation, Ministry of Education and Science, Kazakhstan
- Agencia Nacional de Promoción Científica y Tecnológica and Fondo para la Investigación Científica y Tecnológica del Ministerio de Ciencia, Tecnología e Innovación Productiva, Argentina

Scientific Visits to other Institutions

- Universidad Industrial de Santander, 23-27 October 2017, Bucaramanga (Colombia).

2017 List of Publication

1. L. Becerra, M. Guzzo, F. Rossi-Torres, J. A. Rueda, R. Ruffini, J. D. Uribe, “Neutrino Oscillations within the Induced Gravitational Collapse Paradigm of Long Gamma-Ray Bursts”, *The Astrophysical Journal* 852, 120 (2018).
2. Gómez, L. Gabriel; Rueda, J. A., “Dark matter dynamical friction versus gravitational wave emission in the evolution of compact-star binaries”, *Physical Review D* 96, 063001, 2017.
3. Cipolletta, Federico; Cherubini, Christian; Filippi, Simonetta; Rueda, Jorge A.; Ruffini, Remo, “Equilibrium Configurations of Classical Polytropic Stars with a Multi-Parametric Differential Rotation Law: A Numerical Analysis”, *Communications in Computational Physics* 22, 863, 2017.
4. Cipolletta, F.; Cherubini, C.; Filippi, S.; Rueda, J. A.; Ruffini, R., “Last stable orbit around rapidly rotating neutron stars”, *Physical Review D* 96, 024046, 2017.
5. Coelho, Jaziel G.; Cáceres, D. L.; de Lima, R. C. R.; Malheiro, M.; Rueda, J. A.; Ruffini, R., “The rotation-powered nature of some soft gamma-ray repeaters and anomalous X-ray pulsars”, *A&A* 599, A87, 2017.
6. Cáceres, D. L.; de Carvalho, S. M.; Coelho, J. G.; de Lima, R. C. R.; Rueda, Jorge A., “Thermal X-ray emission from massive, fast rotating, highly magnetized white dwarfs”, *MNRAS* 465, 4434, 2017.
7. Rueda, Jorge A.; Aimuratov, Y.; de Almeida, U. Barres; Becerra, L.; Bianco, C. L.; Cherubini, C.; Filippi, S.; Karlica, M.; Kovacevic, M.; Fuksman, J. D. Melon; Moradi, R.; Muccino, M.; Penacchioni, A. V.; Pisani, G. B.; Primorac, D.; Ruffini, R.; Sahakyan, N.; Shakeri, S.; Wang, Y., “The binary systems associated with short and long gamma-ray bursts and their detectability”, *IJMPD* 26, 1730016, 2017.

Sigismondi Costantino

Position: Professor

Period covered: 1/11/2016-11/1/2018



I Scientific Work

Nova SCT 2017 and Nova SGR 2015 photometry with Schmidt-Cassegrain 8" telescope.

Completion of more than 2000 observation of variable stars for AAVSO database, of which 1000 in the last 2.5 years, mainly the Supergiant Betelgeuse and Antares and the Novae.

II Conferences and educational activities

II a Conferences and Other External Scientific Work UniCusano Workshop on Middle East Astronomy (26-27.X.2017) SIA Società Italiana di Archeoastronomia, National Congress Sapienza 6-8.IX.2017.

II b Work With Students History of Astronomy: coordinating studies on Angelo Secchi (1818-1878)

II c Diploma thesis supervision Tycho Brahe and the restoration of Astronomy (2017-2018)

II d Other Teaching Duties History of Astronomy chair (Pontifical University Regina Apostolorum, UPRA Rome)

II e. Work With Postdocs/

III. Service activities

III a. Within ICRANet Teacher in Scuola-Lavoro activities with Lyceum Galilei, Pescara

Notte dei Ricercatori Pescara 29.IX.2017

Organization and realization of Fermi and Astrophysics events at Fondazione Besso

Roma, 12.XII.2017, 8.I.2018 and 12.XII.2018 with 53 students of Rome Lyceum G. Ferraris

Preparation of Online Course on History of Astronomy and Astrophysics for Alternanza Scuola Lavoro Lyceums G. Ferraris, Roma G. Marconi, Civitavecchia and G. Galilei, Pescara. ([link](#)) (#)

Edition of Experimental Geometrical and Quantum Optics, in Gerbertus 10 (2017) for High Schools

Organization of Secchi and Astrophysics parallel session in Marcel Grossmann Meeting XV (Rome, July 2018)

III b. Outside ICRANet

UPRA course on History of Astronomy and direction of Master thesis

Lyceum Galileo Ferraris and ITIS, Rome courses on Physics and Laboratory.

Organization of the day in honor of Angelo Secchi bicentennial 27.2.2018 at UPRA

IV. Other

Participation to the Course on Modern Physics and to the Conferences Fisincittà

Rome 3 University November 2017- February 2018

and to the Course of Molecular Dynamics by Roberto Car (Fermi Chair 2017)

Sapienza University March-June 2017

2017 List of Publication

1. 2017arXiv170805065S Sigismondi, Costantino, Umbra in partial lunar eclipses at moonrise
2. 2017Gerb...10..119S Sigismondi, Costantino; Agolini, Giorgia, Il metodo di Aristarco à solo un modello?
3. 2017Gerb...10..107S Sigismondi, Costantino; Regoli, Irene , Allineamento della Basilica di san Pietro col Sole
4. 2017Gerb...10..123S Sigismondi, Costantino; Calore, Carlo ,Studi prospettici sulla fascia dell'eclittica dell'Atlante Farnese
5. 2017Gerb...10..105R Ruffini, Remo; Sigismondi, Costantino, Compressione gravitazionale in una dimensione
6. 2017Gerb...10...99S Sigismondi, Costantino, Misura di g con pendolo non in regime caotico
7. 2016Gerb...10...83S Sigismondi, Costantino, Effemeridi del transito meridiano 2017-2020 per la basilica di Santa Maria degli Angeli in Roma
8. 2016Gerb...10...75S Sigismondi, Costantino, Meaning and reception of the Gregorian Reformation of the Calendar
9. 2016Gerb...10...65S Sigismondi, Costantino; Petracca, Francesco Luigi, Energia di un sisma e oscillazioni di un pendolo

10. 2018arXiv/submit/2117830 Sigismondi, Costantino, Differential refraction, 2017 winter solstice timing and true ecliptic obliquity measured at the meridian line of Santa Maria degliAngeli in Rome
11. Ottica Sperimentale Quantistica e Geometrica, Sigismondi, C. e Daniele Impellizzeri Gerbertus 11 107-126 (2017) online

<http://www.icra.it/gerbertus/2017/ottica.pdf>

<https://docs.google.com/document/d/1BboioZGtkQFO-bEQoEbYoW8ygPvnFj7Kvug6I-Ejl4g/edit#>

Siutsou Ivan

Position: research fellow, ICRANet-Minsk, B.I. Stepanov Institute of Physics, NAS of Belarus

Period covered: May, September-October 2017



I Scientific Work

1. *Spotlight mechanism of GRB emission was analyzed and its efficiency was estimated (in preparation)*
2. *The accuracy of the numerical scheme for treatment of Boltzmann-Uehling-Uhlenbeck kinetic equation for two-particle interactions in electron-positron-photon plasma was estimated and compared to the known analytic results (with N.O. Prokopenya and G.V. Vereshchagin, submitted)*

II Conferences and educational activities

II a. *«Anisotropy of optical depth in relativistically moving media and its implications to GRB emission», 1st ICRANet-Minsk workshop on high energy astrophysics, Minsk, IP of NASB, April 26-28 2017*

II b. *Work with PhD student N.O. Prokopenya (scientific advisor — G.V. Vereshchagin)*

II c. *Diploma thesis supervision — no*

II d. *Other Teaching Duties — no*

II e. *Work With Postdocs — no*

III. Service activities *[activities carried out in collaboration with ICRANet (e.g. teaching activities, conferences etc...) and outside ICRANet (teaching activities in your university etc...)]*

III a. *Organization of the 1st ICRANet-Minsk workshop on high energy astrophysics, Minsk, IP of NASB, April 26-28 2017*

III b. *Organization of the VI Congress of physicists of Belarus, Minsk, IP of NASB, November 20-23 2017*

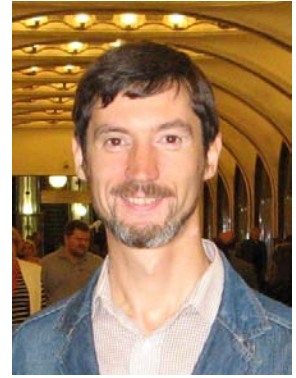
IV. Other

2017 List of Publication

1.N.O. Prokopenya, I.A. Siutson, G.V. Vereshchagin. Numerical scheme for treatment of Boltzmann-Uehling-Uhlenbeck kinetic equation for two-particle interactions in electron-positron-photon plasma // Journal of Computational Physics (submitted).

Vereshchagin Gregory

Position: researcher
Period covered: 2017



I Scientific Work

The work focused on the following aspects:

- Photon-photon scattering and absorption of high energy photons in the Universe

Photon-photon scattering of gamma-rays on the cosmic microwave background has been studied using the low energy approximation of the total cross section by Zdziarski and Svensson. Here, the cosmic horizon due to photon-photon scattering is accurately determined using the exact cross section and we find that photon-photon scattering dominates over the pair production at energies smaller than 1.68 GeV and at redshifts larger than 180.

- Bose enhancement and Pauli blocking in the pair plasma (with I.A. Siutsou, A.G. Aksenov and N.O. Prokopenya)

Interactions in homogeneous electron-positron-photon plasma are studied numerically using the relativistic kinetic Boltzmann equation, with collision integrals given by QED. Efficient method for computations of reaction rates of two-particle interactions is developed. The results are compared with analytical approximations, showing excellent agreement.

- Thermal emission in the early afterglow of GRBs from their interaction with supernova ejecta (with R. Ruffini and Yu Wang)

The interaction between the GRB ejecta and a baryonic shell is considered in the context of the binary driven hypernova model of Gamma-Ray Bursts. The kinematic and observational properties of the shell after the interaction are derived. In particular, the temperature and the duration of the thermal emission are obtained. The model is then applied to GRB 090618 and the observed characteristics of the thermal component are reproduced.

- Inflationary measure in loop quantum cosmology (with S. Bedic)

Recently a contradiction between Liouville's theorem and attractor-like behavior in inflationary models has been analyzed by Remmen and Carroll. Motivated by their analysis we perform the study of inflationary measure in loop quantum cosmology. In addition, we analyze the stability of bouncing solutions using Lyapunov exponents.

II Conferences and educational activities

II a Conferences and Other External Scientific Work

- First ICRANet-Minsk workshop on high energy astrophysics, National Academy of Sciences of Belarus, Minsk, Belarus, April 26-28, 2017. Talk: “Cosmic horizon for GeV sources and photon-photon scattering”.
- XIII International Conference on Gravitation, Astrophysics and Cosmology and 15th Italian-Korean Symposium on Relativistic Astrophysics: A joint meeting, Ewha Womans University, Seoul, Korea, July 3 - 7, 2017. Talk “Cosmic horizon for GeV sources and photon-photon scattering”.

II b Work With Students

- David Melon Fursman (IRAP PhD): on generation of multiple shocks in GRB outflows
- Nikolai Prokopenya (NASB): reaction rates in relativistic plasma
- Susana Bedic (IRAP PhD): inflationary measure in loop quantum cosmology

II c Diploma thesis supervision

II d Other Teaching Duties

II e. Work With Postdocs

- Ivan Siutsou: on Bose enhancement and Pauli blocking in the pair plasma
- Wang Yu: on thermal emission in early afterglow from the GRB-SNR interaction

III. Service activities [*activities carried out in collaboration with ICRANet (e.g. teaching activities, conferences etc...) and outside ICRANet (teaching activities in your university etc...)*]

III a. Within ICRANet

- Member of the IRAP PhD Faculty
- coordination of cooperation with the Belarusian State University
- coordination of cooperation with the National Academy of Sciences of Belarus
- coordination of activities in ICRANet-Minsk center
- organizational work for Fifteenth Marcel Grossmann Meeting
- organizational work for Third Zeldovich Meeting
- organizational work for the 15th Italian-Korean symposium on relativistic astrophysics
- supervision of the ICRANet newsletter
- supervision of ICRANet press releases

III b. Outside ICRANet

- Co-PI of the scientific program “Relativistic astrophysical objects and phenomena” within the Belorussian state program “Convergence-2020”, subprogram “Microworld and Universe”.

IV. Other

This year the monograph "Relativistic Kinetic Theory With Applications in Astrophysics and Cosmology" written in co-authorship with Alexey Aksenov from ICAD, RAS, has been published by Cambridge University Press. It represents nearly 10 years of research work.

2017 List of Publication

1. G.V. Vereshchagin and A. G. Aksenov, "Relativistic Kinetic Theory With Applications in Astrophysics and Cosmology", Cambridge University Press, 2017.
2. R. Ruffini G. V. Vereshchagin Yu Wang, “Thermal emission in the early afterglow of GRBs from their interaction with supernova ejecta”, A&A 600 (2017) A131.
3. G.V. Vereshchagin, “Cosmic horizon for GeV sources and photon-photon scattering”, accepted for publication in Astrophysics and Space Science, 2018.
4. V.A. Belinski and G.V. Vereshchagin, “On the cosmological gravitational waves and cosmological distances”, submitted to Phys. Lett. B, 2017.
5. G.V. Vereshchagin and S. Bedic, “Inflationary measure in loop quantum cosmology”, in preparation.
6. N. O. Prokopenya, I. A. Siutsou, G. V. Vereshchagin, “Numerical scheme for treatment of Uehling-Uhlenbeck kinetic equation for two-particle interactions in electron-positron-photon plasma”, submitted to Journal of Computational Physics, 2017.

Vieira Lobato Ronaldo

Position: IRAP Ph.D. Student
Period covered: 2016-2018



I Scientific Work

Relativistic astrophysics:

- Electromagnetic emission mechanisms of white dwarfs and neutron stars, under supervision of Prof. Manuel Malheiro, Prof. Jorge A. Rueda, Dr. Jaziel Coelho and Prof. Remo Ruffini.
- Binaries stars and supernova explosion, under supervision of Prof. Jorge A. Rueda, Prof. Manuel Malheiro, and Prof. Remo Ruffini.
- Structure and evolution of strange white dwarfs, in collaboration with Edson Otoniel and Manuel Malheiro.
- Cooling in white dwarfs, in collaboration with Edson Otoniel, Rodrigo Negreiros and Manuel Malheiro.

Gravitation:

- Higher-dimensional and alternatives theories of gravity, in collaboration with Prof. Pedro Moraes and Geanderson Carvalho

II Conferences and educational activities

- Gravitational Waves in the strong field limit: 5th Bego Scientific Rencontre
- 7th International Workshop on Astronomy and Relativistic Astrophysics
- 14th Italian-Korean Symposium on Relativistic Astrophysics
- Minicourse on Numerical Relativity
- School on Effective Field Theory across Length Scales
- Fourteenth Marcel Grossmann Meeting
- School on gravitational waves

2017 List of Publication

- Moraes, P. H. R. S., Correa, R. A. C., & Lobato, R. V. (2017). Analytical general solutions for static wormholes in $f(R, T)$ gravity. *Journal of Cosmology and Astroparticle Physics*, 2017(07), 029.
- Carvalho, G. A., Lobato, R. V., Moraes, P. H. R. S., Arbañil, J. D., Marinho Jr, R. M., Otoniel, E., & Malheiro, M. (2017). Stellar equilibrium configurations of white dwarfs in the $f(R, T)$ gravity. *The European Physical Journal C*, 2017(77), 871.
- Lobato, R. V., Coelho, J. G., & Malheiro, M. (2017). Ultra-high energy cosmic rays from white dwarf pulsars and the Hillas criterion. *arXiv preprint arXiv:1703.06208*. *Journal of Physics: Conference Series*, Volume 861, Issue 1, article id. 012005 (2017).
- Ronaldo V. Lobato, Manuel Malheiro, and Jaziel G. Coelho (2017) SGRs/AXPs as white dwarf pulsars: Sources of ultra-high energetic photons with $E \sim 10^{21}$ eV. The Fourteenth Marcel Grossmann Meeting: pp. 4313-4318.
- M. Malheiro, R. M. Marinho, R. V. Lobato, and J. G. Coelho (2017) Are ultra-magnetized white dwarfs stable?. The Fourteenth Marcel Grossmann Meeting: pp. 4363-4371.
- Otoniel, E., Lobato, R. V., Malheiro, M., Franzon, B., Schramm, S., & Weber, F. (2017). White Dwarf Pulsars and Very Massive Compact Ultra Magnetized White Dwarfs. In *International Journal of Modern Physics: Conference Series* (Vol. 45, p. 1760024). World Scientific Publishing Company.
- Malheiro, M., Coelho, J. G., Cáceres, D. L., de Lima, R. C. R., Lobato, R. V., Rueda, J. A., & Ruffini, R. (2017, June). Possible rotation-power nature of SGRs and AXPs. In *Journal of Physics: Conference Series* (Vol. 861, No. 1, p. 012003). IOP Publishing.

Zargaryan Davit

Position: Ph.D. student
Period covered: 2016-2019



I Scientific Work

High Energy Astrophysics. Data Analysis.

II Conferences and educational activities

- 1-st ICRANet Scientific Meeting in Armenia: Black Holes and the largest energy sources in the Universe (2014).
- The 6th International Symposium on High-Energy Gamma-Ray Astronomy (Gamma 2016), Heidelberg, Germany.
- High-Energy Phenomena in Relativistic Outflows VI (HEPRO 6), Moscow, Russia (2017).

2017 List of Publication

D. Zargaryan, S. Gasparyan, V. Baghmanyan and N. Sahakyan, Comparing 3C 120 jet emission at small and large scales, Astronomy & Astrophysics.

IRAP Ph. D. Erasmus Mundus Students

CONTACT INFORMATION	Downing College, Regent Street Cambridge, CB2 1DQ, England	<i>Mobile</i> +44-782 127 9557 <i>E-mail:</i> olof.ahlen@gmail.com
BIRTH	20th of January 1989 in Hudiksvall, Sweden Swedish Citizenship	<i>Personal Identity No:</i> 8901207558
EDUCATION	<p>Max Planck Institute for Gravitational Physics Potsdam, Germany (Albert Einstein Institute)</p> <p>PhD in Theoretical Physics Fall 2013 to Spring 2016 Ongoing</p> <ul style="list-style-type: none"> • Mathematical aspects of String Theory. • First year based at the University of Cambridge (see below). • Supervisors: Prof. H. NICOLAI and Dr. A. KLEINSCHMIDT. <p>University of Cambridge (Downing College) Cambridge, England</p> <p>MAst in Applied Mathematics Fall 2013 to Spring 2014 Ongoing</p> <ul style="list-style-type: none"> • “Part III of the Mathematical Tripos” <p>Chalmers University of Technology Gothenburg, Sweden</p> <p>MSc in Applied Physics Fall 2011 to Spring 2013 Grade Point Average: 4.7/5.0</p> <ul style="list-style-type: none"> • Increased study rate (150%) <p>BSc in Engineering Physics Fall 2008 to Spring 2011 Grade Point Average: 4.7/5.0</p> <p>Mandarin High School Jacksonville, Florida</p> <p>High School exchange student Fall 2006 to Spring 2007 Grade Point Average: 4.0/4.0</p> <p>Lerums Gymnasium Lerum, Sweden</p> <p>Swedish High School Fall 2004 to Spring 2008 Grade Point Average: 20.0/20.0</p>	
WORK EXPERIENCE	<p>European Organization for Nuclear Research (CERN) Geneva, Switzerland</p> <p><i>Technical student</i> July 2012 to August 2013</p> <ul style="list-style-type: none"> • Data analysis and physics modelling at the antimatter experiment AEGIS. • Extensive volunteering as an official CERN visitor’s guide. <p><i>Summer student</i> Summer of 2011</p> <ul style="list-style-type: none"> • Programming a graphical user interface in Python. 	

	Chalmers University of Technology <i>Teacher (University level)</i> <ul style="list-style-type: none"> • Complex- and Fourier Analysis, Electromagnetic Field Theory and more. 	Gothenburg, Sweden September 2009 to June 2011
	iku Mathematics <i>Teacher in Mathematics (High School level)</i>	Gothenburg, Sweden Summer of 2010
	Neun Consulting Group <i>Web developer</i>	Gothenburg, Sweden Summer of 2009 and 2010
	Eurologic AB <i>Telemarketer</i>	Gothenburg, Sweden Summer of 2008
LANGUAGES	Swedish, English: Fluent (112/120 on the TOEFL) German, French: Intermediate	
EXTRA— CURRICULARS	University Choir of Chalmers (4 years) — Music <ul style="list-style-type: none"> • Substitute conductor, concertmaster, singer and accompanying pianist. Grupo Iê Bahia Capoeira (5 years) — Sports (Martial arts) Downing College Boat Club — Sports (Rowing) Nova 100 and Nova Pro — Academic talent network <ul style="list-style-type: none"> • The criteria for membership include a strong combination of excellent academic qualifications, social skills and business drive. Member since February 2012. Other interests: Dancing, Close-up magic, Classical piano	
COMPUTER SKILLS	Word Processing: Office suites, Vim, L ^A T _E X. Mathematical Software: MATLAB, Wolfram Mathematica, Excel. Engineering: LabVIEW, Comsol Multiphysics. Programming: C, OpenCL, Java, JavaScript, Python, Django, PHP, MySQL, HTML. Operating Systems: Windows, MacOS, Linux.	
AWARDS & SCHOLARSHIPS	First place: Teknik SM Qualifications 2012. 459 contestants in teams of three. The Royal Swedish Academy of Sciences: 88 000 SEK (~ \$13 400 US) Willinska Stiftelsen och Göteborgs Arbetsstugor: 10 000 SEK (~ \$1 500 US)	
REFERENCES	Dr. Michael Doser (michael.doser@cern.ch ; +41-22 76 77284) <ul style="list-style-type: none"> • Supervisor during technical internship at CERN. Dr. Suitbert Ramberger (suitbert.ramberger@cern.ch ; +41-22 76 75931) <ul style="list-style-type: none"> • Supervisor during summer internship at CERN. Dr. Jana Madjarova (jana@chalmers.se ; +46-31 772 3531) <ul style="list-style-type: none"> • Program Director at Engineering Physics, Chalmers. 	

Aimuratov Yerlan

Position: PhD student (EMJD IRAP V cycle)
Period covered: January 2015 – December 2017



I Scientific Work

Gamma-Ray Bursts and Supernovae: Data Analysis and Theory

II Conferences and educational activities

II a Conferences and Other External Scientific Work

- Weekly ICRANet seminars by invited Professors, PostDocs and Students, January 2017-Dec. 2017
- “Exploring the Energetic Universe”, 2017 August 6th-13th, Astana, Kazakhstan
- “BelINP-2017 and ICRANet-Minsk Workshop”, 2017 April 26th-28th, Minsk, Belarus
- “An Adriatic Workshop: SNe, Hypernovae and BDHNe”, 2016 June 20th-30th, Pescara, Italy
- “Summer School on Cosmology”, ICTP, 2016 June 6th-17th, Trieste, Italy
- “4th Bego Rencontres”, IRAP PhD Erasmus Mundus School, 2016 May 30th-June 3rd, Nice, France
- Weekly ICRANet seminars by invited Professors, PostDocs and Students, January 2016-Dec. 2016
- Seminar in Fesenkov Astrophysical Institute, 2015 August 5th, Almaty, Kazakhstan
- “14th Italian-Korean Symposium on Relativistic Astrophysics”, July 20th-24th, Pescara, Italy
- “Marcel Grossmann Meeting XIV”, 2015 July 12th-18th, Rome, Italy
- Weekly ICRANet seminars by invited Professors, PostDocs and Students, March 2015-Dec. 2015
- “1st ICRANet Lecture Series for PhD students” organized by L. Izzo, February-June 2015

II b Work With Students

- GBM data reduction and analysis, June-December 2017
with IRAP PhD student R. Moradi, D. Primorac, Y. Wang,
- LAT-LLE data reduction and analysis, October 2016
with EMJD PhD student M. Kovacevic
- XRT data reduction and analysis, March-September 2016
with IRAP PhD students R. Moradi, M. Peresano, S. Shakeri, Y. Wang

II c Diploma thesis supervision

None

II d Other Teaching Duties

None

II e. Work With Postdocs

- fireshell model and analysis procedure for GRBs with RMFIT, XSPEC with ICRANet Postdoc M. Muccino, February 2015-November 2017
- data reduction and analysis with HEASOFT with ICRANet Postdoc L. Izzo, November-December 2015

III. Service activities [*activities carried out in collaboration with ICRANet (e.g. teaching activities, conferences etc...) and outside ICRANet (teaching activities in your university etc...)*]

III a. Within ICRANet

- participation and oral presentation “GRB 140402A and Subclass of S-GRBs: Phenomenology” “BelINP-2017 and ICRANet-Minsk Workshop”, 2017 April 26th-28th, Minsk, Belarus
http://icranet.org/index.php?option=com_content&task=view&id=1092&Itemid=942
- participation and oral presentation: “X-ray Flares and Thermal Component” “An Adriatic Workshop: SNe, Hypernovae and BDHNe”, 2016 June 20th-30th, Pescara, Italy
<http://icranet.org/am/>
- participation in “Forth Bego Rencontres” meeting IRAP PhD Erasmus Mundus School, 2016 May 30th-June 3rd, Nice, France
http://icranet.org/index.php?option=com_content&task=view&id=986
- participation and oral presentation: “GRB 081024B Analysis and Redshift Estimation” “14th Italian-Korean Symposium on Relativistic Astrophysics”, 2015 July 23rd, Pescara, Italy
http://icranet.org/index.php?option=com_content&task=view&id=935&Itemid=904#
- participation, proceeding and oral presentation: “Analysis of the GRB 081024B” “Marcel Grossmann Meeting XIV”, 2015 July 17th, Rome, Italy
parallel session GB5-A: http://www.icra.it/mg/mg14/parallel_sessions.htm

III b. Outside ICRANet

- participation and oral presentation “The Fireshell Model Nomenclature: Subclass of Short GRBs” “Exploring the Energetic Universe”, 2017 August 6th-13th, Astana, Kazakhstan
<http://ecl.nu.edu.kz:8080/program-for-exploring-the-energetic-universe-conference>
- participation in “Summer School on Cosmology” for PhD students and young researchers International Centre for Theoretical Physics, 2016 June 6th-17th, Trieste, Italy
<http://indico.ictp.it/event/7626/overview>
- oral presentation: “Gamma-Ray Bursts within the Fireshell Model” seminar in Fesenkov Astrophysical Institute, 2015 August 5th, Almaty, Kazakhstan
<http://aphi.kz/seminar-by-yerlan-aimuratov.html>

IV. Other

IV a. Within ICRANet and b. Outside ICRANet

2015-2018 List of Publication

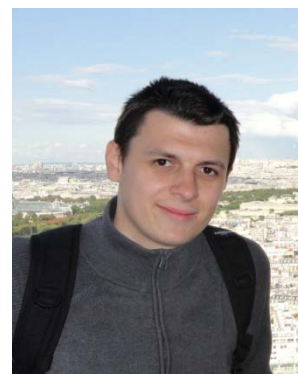
- <https://orcid.org/0000-0001-5717-6523>

Baranov Andrey

Position: Ph. D. student (Erasmus Mundus Program),

LAPTH, Universite de Savoie, Annecy-le-Vieux, France

Period covered: 09/2010-09/2013



I Scientific Work

In our group under supervision of Prof. Pascal Chardonnet we study evolution and fate of very massive stars. These stars should end their life as pair-instability supernovae, so we perform numerical analysis of pair-instability explosion. The first stars in the Universe, called Population III stars, since they are metal free, should produce pair-instability supernovae with a rate greater than what is observed now. So we also study influence of explosions of massive stars on early Universe.

II Conferences and educational activities

II a Conferences and Other External Scientific Work

IAU Symposium 279 "The Death of Massive Stars", Nikko, Japan, 12-16 March 2012

13th Marcel-Grossmann meeting, Stockholm, Sweden, 1-7 July 2012

Erasmus Mundus schools in University of Nice

4-8 June, 2012

1-21 September, 2012

Bardho Onelda

Position: PhD Student

Period covered: 01/02/2013 – 31/01/2016



I Scientific Work

GRBs are flashes of gamma-rays coming from cosmos. They are one of the most mysterious events we have been able to observe since their discovery.

GRBs are classified into two groups: long/soft GRBs and short/hard GRBs. Their emission mechanism consists of two phases: prompt emission and afterglow emission.

The launch of the Swift satellite opened a New Era in the GRBs research. Swift is able to provide accurate position for more GRBs than previous missions, thanks to its fast capabilities of slewing. Furthermore the Swift shows that GRBs have a canonical behaviour for the X-ray afterglow light curves.

The data analysis process remains the key point of GRBs studies. I present a detailed study of the peculiar GRB 141221A at different wavelengths. GRB 141221A shows an unusual steep rise in the optical light curve of the afterglow. The broad band spectral energy distribution, taken near the maximum of the optical emission, presents either a thermal component or a behaviour break. This burst displays unusual feature in the optical band, whereas the X-ray data is more common. GRB 141221A is one of the challenging bursts that excludes a stellar wind from the progenitor of the GRBs.

A clustering in the X-ray afterglow light curves was observed before the launch of the Swift satellite. This feature has been debated after the launch of the Swift. We have built a sample which consists of 254 GRBs that shows a scattering of the data for the flux distribution at one day. This distribution was investigated with a normalization of light curves at redshift one.

We have investigated the problem into three different directions: 1. Instrumental Problems, 2. Data Calibration Problems, 3. Absence of clustering.

The investigation of the instrumental problems is related to the observation problems of the Swift satellite along the year, since we observe some seasonal effects during solstices and equinoxes. The earth limb angle is one evidence that there are not instrumental problems rather than data processing problems. The data shows that the admission limit angle is overtaken.

The data calibration process is an interesting issue which might influence the results of the study. I provide different evidences towards problems that can induce serious flows in the results of data analysis process, by comparing the manual and the automatic data analysis found from Swift - XRT repository. I suggest the cases where the manual analysis should be performed and the cases where the automatic analysis does not affect the results.

The last possibility of the non-existence of this clustering should be a selection effect. This is because before the launch of the Swift satellite, the possibility of observing the X-ray afterglow was extremely low. However it is extremely difficult to find a bias in this analysis that was performed using the data from two different satellites.

II Conferences and educational activities

II a Conferences and Other External Scientific Work

1. The National Meeting on High Energy, 11-12 February 2013, CNES, Paris, France

2. IVth School of Astroparticle Physics - Gravitational Waves, OHP, Saint Michel l'Observatoire - May 27th - juin 1st, 2013.
3. IVth School of Astroparticle Physics - Gravitational Waves, OHP, Saint Michel l'Observatoire - May 27th - juin 1st, 2013.
4. Eleventh NEON observing school, La Palma – Canary Islands, 14-27 July 2013
5. LSC – Virgo Collaboration meeting, Nice – France, March 17-21, 2014
6. The 40th COSPAR Scientific Assembly, Moscow – Russia, August 2- 10, 2014
7. International Workshop on LHC, Astrophysics, Medical and Environmental Physics, Shkodra (Albania), October 6-8, 2014
8. Swift: 10 Years of discovery, Roma – Italy, 2 – 5 December 2014
9. Fourteenth Marcel Grossmann Meeting - MG14, 12 - 18 July 2015, Roma, Italy

II b Work With Students

II c Diploma thesis supervision

Michel BOER (ARTEMIS/OCA -Nice)

II d Other Teaching Duties

II e. Work With Postdocs

III. Service activities [*activities carried out in collaboration with ICRANet (e.g. teaching activities, conferences etc...) and outside ICRANet (teaching activities in your university etc...)*]

III a. Within ICRANet

1. Second Bego Scientific Rencontre Meeting, Nice-France, May 16-31, 2013
2. IRAP Ph.D. Erasmus Mundus school, Nice – France, September 02 - 20, 2013
3. Winter school, IRAP Ph.D Erasmus Mundus Nice – France, February 23 – March 2, 2014
4. Supernovae, Gamma-ray Bursts and Induce gravitational collapse , IRAP PhD and Erasmus Mundus Workshop, Les Houches – France, May 11-16, 2014
5. Third Bego Rencontres, IRAP Ph.D. Erasmus Mundus school, Nice-France, September 8-19, 2014

III b. Outside ICRANet

Seminar

Invited by Etelman Observatory-Saint Thomas and University of the Virgin Islands, September 2015, Virgin Islands, USA

IV. Other

Mobility 6 months (02 February - 31 July 2015) in Bologna/Ferrara. I have been working in the GRB group in Bologna under the supervision of my Co-supervisor, Lorenzo AMATI and collaborating with the group in Ferrara.

V. List of Publication

Proceeding

O. Bardho, M. Boer, B. Gendre, “10 Years of XRT light curves: a general view of the X-ray afterglow”, in proceedings of “Swift: 10 years of Discovery”, POS(SWIFT 10) 062

Journal

O. Bardho, B. Gendre, A. Rossi et.al; “GRB 141221A: gone is the wind”, MNRAS 459, 508-516. March 2016

Bégué Damien

Position: Postdoc at the Royal Institute of Technology
Stockholm, Sweden
Period covered: 2015



I Scientific Work

Photospheric emission of Gamma-Ray bursts, magnetic reconnection, non-thermal emission in the framework of the external shock model.

II Conferences and educational activities

Cesare Lattes Meetings, Rio, April 2015

III. Service activities

IV. Other

2015 List of Publication

Poynting-flux dominated Jets challenged by their Photospheric emission, Bégué and Pe'er, ApJ 802 134B, 2015

Alberto Benedetti

Position: 3rd year Erasmus Mundus PhD Student

Period covered: September 2010 –

Scientific Work

We studied the entire dynamics of energy conversion from initial overcritical electric field, ending up with thermalized electron-positron-photon plasma. Our approach is based on the kinetic theory which allows to determine the time evolution of each particle distribution function including the effects due to particles interactions. Hence we solved numerically the relativistic Vlasov-Boltzmann equations for electrons, positrons and photons, with collision integrals for 2-particle interactions computed from exact QED matrix elements. The adopted numerical method is characterized by having an adaptive time step which enables us to follow physical processes occurring on very different time-scales. Firstly pair creation occurs from vacuum breakdown and secondly back reaction results in plasma oscillations. Thirdly photons are produced by electron-positron annihilation. Finally particle interactions lead to completely equilibrated thermal electron-positron-photon plasma. This work generalizes some of the results obtained up to now in this field of research. In particular, considering a more general phase space, the conversion of energy into rest mass energy of electron-positron pairs is shown to be less efficient. In fact, most of the initial energy is transformed into thermal energy of particles.

The scheme described above has been generalized and it will be applied to the study of the GRBs photospheric emission. We want to follow the photon, electron and proton distribution functions when the relativistic outflow approaches transparency in order to investigate their effects on the observed spectra.

Conferences and educational activities

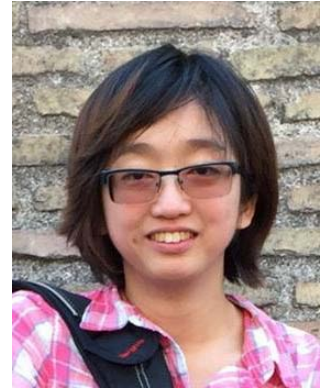
- IRAP Ph.D. Erasmus Mundus Workshop, April 5, 2011, Pescara (Italy)
- IRAP Ph.D. Erasmus Mundus Workshop, April 3-8, 2011, Les Houches (France)
- Fermi Symposium, May 9-12, 2011, Rome (Italy)
- Advances in Computational Astrophysics: methods, tools and outcomes, June 13-17, 2011, Cefalù (Italy)
- Italian-Korean Meeting, July 4-9, 2011, Pescara (Italy)
- IRAP Ph.D. Erasmus Mundus School, September 7, 2011, Nice (France)
- IRAP Ph.D. Erasmus Mundus Workshop, October 6, 2011, Les Houches (France)
- Galileo-Xu Guanqui Meeting, October 12, 2011, Beijing (China)
- Marcel Grossmann meeting, Stockholm, Sweden, 1st - 7th July, 2012.
- IRAP Ph.D. Erasmus Mundus School", Nice, France, 3rd – 19th September, 2012.

List of Publications

- "On the frequency of oscillations in the pair plasma generated by a strong electric field"
A. Benedetti, W.-B. Han, R. Ruffini, G.V. Vereshchagin, Physics Letters B 698 (2011) 75–79
- "Phase space evolution of pairs created in strong electric fields"
A. Benedetti, R. Ruffini, G. V. Vereshchagin, proceedings of the 12th Italian-Korean Meeting to be published by the Italian Physical Society (SIF) in the Volume "Nuovo Cimento C".
- "Phase space evolution of pairs created in strong electric fields"
A. Benedetti, R. Ruffini, G.V. Vereshchagin, Physics Letters A (accepted for publication)

Chang, Yu-Ling

Position: PhD student
Period covered: 2014-2017



I Scientific Work

- Multi-frequency studies of blazars.
- Properties of blazars and radio-loud AGNs.

II Conferences and educational activities

II a Conferences and Other External Scientific Work

May 25 – May 26, 2015-13th Agile workshop “Agile: 8 and counting”, ASI headquarters, Rome, Italy.

June 14 – June 19, 2015- IVOA Interoperability Woorkshop, Sesto, Italy.

July 12 – July 18, 2015- Fourteenth Marcel Grossmann Meeting, Rome, Italy.

May 30 – June 3, 2016- Fourth Bego Rencontres-IRAP Ph.D. Erasmus Mundus school, Nice, France.

June 20 – June 21, 2016-14th Agile workshop “Agile on the wave”, ASI headquarters, Rome, Italy.

June 27 – July 1, 2016- "Active Galactic Nuclei: what's in a name?" Workshop, Garching, Germany.

May 15 – May 19, 2017- Fifth Bego Rencontres-IRAP Ph.D. Erasmus Mundus school, Nice, France.

May 23 – May 24, 2016-15th Agile workshop “Agile is 10: the way we were , the WAVE we are”, ASI headquarters, Rome, Italy.

June 25 – June 30, 2017 The Galileo-Xu Guangqi meeting, Cheng-du, Mainland China

2017 List of Publication

Chang, Y.-L.; Arsioli, B.; Giommi, P.; and Padovani, P. 2017, A&A 598, A17

Arsioli, B and Chang, Y.-L. 2017, A&A 598, A134

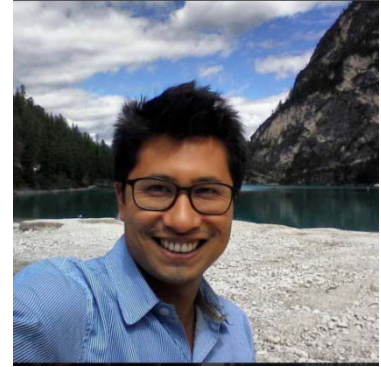
Padovani, P.; Giommi, P.; Resconi, E.; Arsioli, B.; Chang, Y.-L. , 2016, MNRAS 457, 3582

Chang, Y.-L.; Giommi, P.; Arsioli, B.; and Padovani, P. 2018 in preparation

Arsioli, B and Chang, Y.-L. 2018 in preparation

Delgado-Correal Camilo

Position: Erasmus Mundus PhD Student (IRAP - Cycle V)
Period covered: 2015-2018



I Scientific Work

Optical spectroscopy study of high redshift galaxies.

II Conferences and educational activities

II a Conferences and Other External Scientific Work

- *V Meeting of the Colombian Astronomical Society (COCOA 2017) Pereira, Colombia, October 24 to 27, 2017.*
- *Exploring dark matter and dark ages with lensing clusters. Sexten-Italy, July 24 to 28, 2017.*
- *5th Bego Rencontres IRAP Ph.D. Erasmus Mundus school. Nice-France, May 15 to 19, 2017.*
- *Python in Astronomy. Leiden-Netherlands, May 8 to 12, 2017.*
- *Cluster I. Torino-Italy, February 27 to March 1, 2017.*

2017 List of Publication

▪ **C. Delgado-Correal**, P. Rosati, G. B. Caminha, C. Grillo, A. Mercurio, I. Balestra, M. Nonino, and E. Vanzella (2017) “**Identification of low luminosity high redshift galaxies using galaxy clusters as cosmic telescopes**”. The Fourteenth Marcel Grossmann Meeting: pp. 2163-2166.

http://www.worldscientific.com/doi/abs/10.1142/9789813226609_0242

- G. B. Caminha, C. Grillo, P. Rosati, M. Meneghetti, A. Mercurio, S. Ettori, I. Balestra, A. Biviano, K. Umetsu, E. Vanzella, M. Annunziatella, M. Bonamigo, **C. Delgado-Correal**, M. Girardi, M. Lombardi, M. Nonino, B. Sartoris, P. Tozzi, M. Bartelmann, L. Bradley, K. I. Caputi, D. Coe, H. Ford, R. Gobat, M. Postman, S. Seitz, A. Zitrin, “**Mass distribution in the core of MACS J1206: robust modeling from an exceptionally large sample of central multiple images**”, *A&A* 607, A93 (2017) <https://arxiv.org/abs/1707.00690>
- **C. Delgado-Correal**, P. Rosati, G. B. Caminha, C. Grillo, A. Mercurio, I. Balestra, M. Nonino, and E. Vanzella, “**Spectroscopic identification of high redshift lensed galaxies**”, *RevMexAA (Serie de Conferencias)*, 49, 116–116 (2017)

- G. B. Caminha, C. Grillo, P. Rosati, I. Balestra, A. Mercurio, E. Vanzella, A. Biviano, K. I. Caputi, **C. Delgado-Correal**, W. Karman, M. Lombardi, M. Meneghetti, B. Sartoris, P. Tozz, “**A refined mass distribution of the cluster MACS J0416.1–2403 from a new large set of spectroscopic multiply lensed sources**”, A&A 600, A90 (2017) <https://arxiv.org/abs/1607.03462>

Hüsne Dereli

Curriculum Vitae

AlbaNova University Center,
Roslagstullsbacken 21, SE-106 91
Stockholm
+46 (0) 73765 2455
husnedereli@gmail.com,
husne@kth.se



EDUCATION

- 2015 – PRESENT **Postdoc in AstroPhysics**
*The KTH Royal Institute of Technology,
Stockholm, SWEDEN
with Prof. Dr. Felix Ryde*
- 2011–2014 **Ph.D in AstroPhysics**
Title: Study of a Population of
Gamma-ray Bursts with
Low-Luminosity Afterglows
*The University of Nice,
Nice, FRANCE
with Prof. Dr. Michel Boër
& Prof. Dr. Massimo Della Valle*
- 2008–2010 **M.Sc. in AstroPhysics**
Title: Observation of Medium-
High Redshift AGNs
and Their Impact on Cosmology
*The University of Cukurova,
Adana, TURKEY
with Prof. Dr. Aysun Akyüz
& Dr. Denis Bastieri*
- 2002–2006 **B.S. Degree in Physics**
*The University of Cukurova
Adana, TURKEY*
- 2005–2010 **Associate Degree in Finance -
Banking and Insurance**
*The University of Anadolu,
Eskisehir, TURKEY*

AWARDS

- 2015–2016 **TUBITAK Post Doctoral fellowship**
TURKEY
- 2011–2014 **Erasmus Mundus IRAP PhD fellowship**
Nice, FRANCE
- 2009 **Erasmus Student Mobility for Studies
(SMS), Padova, ITALY**
from the 2nd of February to the 31st June
- 2009 **Erasmus Student Mobility for Placements
(SMP), Padova, ITALY**
from the 1st of July to the 31st of September
- 2002–2006 **The Prime Ministry Scholarship**
Adana, TURKEY

RELEVANT RESEARCH FIELDS

- X-ray emission from Gamma Ray Bursts
- Optical emission from Supernovae
- High energy gamma-ray and optical emissions from Active Galactic Nuclei

SEMINARS

- April 2016 “Variability in GRB light curves:
Poisson Orthogonal Matching Pursuit”
The Virgin Islands University,
Saint Thomas, U.S.

PUBLICATIONS

- Dereli, H.**, Boër, M., Gendre, B., L. Amati, L., & Dichiara, S., “A study of GRBs with low Luminosity afterglows”, 2016, ApJ (submitted)
- Ph.D. thesis: **Dereli, H.**, “Study of a Population of Gamma-ray Bursts with Low-Luminosity Afterglows”, 2015, arXiv:1503.04580
- Ruffini, R., Izzo, L., Muccino, M., et al. (**Dereli, H.**) “Induced Gravitational Collapse in the BATSE era: the case of GRB 970828”, 2013 A&A, submitted (arXiv:1311.7432)
- Izzo, L., Ruffini, R., Bianco, C. L., **Dereli, H.**, et al. “On the thermal and double episode emissions in GRB 970828”, 2012a, ApJ, submitted (arXiv:1205.6651)
- Abdo, A. A., Ackermann, M., and Ajello, M., et al., (**Dereli H.**), “Fermi Large Area Telescope Measurements of the Diffuse Gamma-Ray Emission at Intermediate Galactic Latitudes”, 2009, Phys. Rev. Lett. 103, 25
- Ögelman, H., Asaker, N., Anilin, S., **Dereli, H.**, et al., “Discovery of Gamma-ray Emission from M31 via FERMI-LAT”, 2010, AIPS, 1379, 82
- Book: **Dereli, H.**, “Observations of high redshift AGNs and their impact on cosmology”, 2011, LAP Lambert Academic Publishing

OBSERVATION TIME AWARDED

May-July 2016	Optical observations of the blazar PKS 1424+240 <i>TUG, TURKEY</i>
June-Sept. 2016	Target Opportunity Observations for optical follow up of blazar flares <i>TUG, TURKEY</i>
Oct. 2016 - Jan. 2017	Target Opportunity Observations for optical follow up of blazar flares <i>TUG, TURKEY</i>
Now. 2016 - Jan. 2017	Optical observations of the blazars PKS 0716+174 and 1ES 0806+524 <i>TUG, TURKEY</i>

COMPUTER SKILLS

Operating system	Linux (Ubuntu, Fedora), Windows 2000/XP, Mac OS-X
Typesetting	Office XP (Word, Excel, PowerPoint), LATEX
Data analysis tools	Fermi Science Tools, RMFit, HeaSoft package (FTOOLS), Xspec, IRAF (SNOOPY: daophot, APELL)
Graphics and computations	Gnuplot, ROOT, Matlab, Python

LANGUAGES

Turkish	Mother tongue
English	Advanced
Italian	Basic words and phrases only
French	Basic words and phrases only

INTERESTS

- Observing the sky, listening music,
- Reading books, watching movies,
- Drawing, painting, taking pictures,
- Playing volleyball, dancing

PROCEEDINGS & GCN REPORTS

-**Dereli, H.**, Boër, M., Gendre, B., L. Amati, L., & Dichiara, S., "Properties of Low Luminosity Afterglow GRBs", Proceedings of Swift: 10 Years of Discovery (SWIFT 10), held 2-5 December 2014 at La Sapienza University, Rome, Italy. Online at <http://pos.sissa.it/cgi-bin/reader/conf.cgi?confid=233>, id.72

-**Dereli, H.**, Klotz, A., MacPherson, D., et al., "report: GRB 130315A: zadko observatory - gingin optical observations", 2013 GCN: 14330

-**Dereli, H.**, Klotz, A., MacPherson, D., et al., "GRB 130408A: Zadko observatory - Gingin optical observations" GCN: 14372

-Gendre, B., **Dereli, H.**, Atteia, J. L., Boer, M., Klotz, A. "GRB 130215A: TAROT La Silla observatory optical observations", 2013, GCN: 14213

-**Dereli, H.**, et al., 2010, Observation of B2 1520+31 with the Fermi-LAT Telescope, Proceeding of the XVII. National Astronomy and the VI. Student National Congress, the 31th of August - 4th of September 2010, UZAYMER, Cukurova University, Adana, TURKEY

-**Dereli, H.**, et al., 2009, Observation of 3C454.3 with the Fermi-LAT Telescope, Proceeding of the ICYA 2009, 7-13 September 2009, Cracow, POLAND, <http://www.icya2009.org/resources>

REFERENCES

- **Prof. Dr. Michel Boër (Michel.Boer@unice.fr)**
ARTEMIS (CNRS UMR 7250, OCA, UNS), Nice, France
- **Dr. Bruce Gendre (bruce.gendre@gmail.com)**
Etelman Observatory, St Thomas, U.S. Virgin Islands
- **Prof. Dr. Aysun Akyüz (aakyuz@cu.edu.tr)**
Department of Physics, Cukurova University, Adana, Turkey
- **Dr. Denis Bastieri (denis.bastieri@unipd.it)**
Department of Physics, Padova University & INFN, Padova, Italy

Jefremov, Pavel

Position: PhD Student

Period covered: Jan. 2017 – Jan. 2018



I Scientific Work

1. Neutrino cooled accretion
2. Force-free electrodynamics on the curved background
3. Perfect fluid tori around black holes

II Conferences and educational activities

II a Conferences and Other External Scientific Work

1. “Do Black Holes Exist – The physics and philosophy of black holes”, 24 – 28 of April, Bad Honnef, Germany
2. “Between Geometry and Relativity”, 17 – 21 of July, Vienna, Austria
3. “Symposium on Supernova Explosions and Gamma-Ray Bursts”, 11 – 15 of September, Cargèse, France

II b Work With Students

II c Diploma thesis supervision

II d Other Teaching Duties

II e. Work With Postdocs

III. Service activities [*activities carried out in collaboration with ICRANet (e.g. teaching activities, conferences etc...) and outside ICRANet (teaching activities in your university etc...)*]

III a. Within ICRANet

III b. Outside ICRANet

IV. Other

2017 List of Publication

Maxime ENDERLI

Born December 17th 1986. French citizen.

maxime.enderli@gmail.com

Education

- 2012 – 2015
From Sept. 12 **PhD studies in relativistic astrophysics at University of Rome "La Sapienza" within the Erasmus Mundus Joint Doctorate program IRAP PhD :**
"Gamma-Ray Bursts and Cosmological Structures"
- 2010 **Graduation within a Double Degree program:**
- Master of Science in Modern Physics at **Royal Institute of Technology (KTH)**, Stockholm, Sweden
 - Master's Degree in Engineering at **Ecole Centrale de Lyon (ECL)**, Ecully, France

Internships, Professional Experience

- 2011 – 2012
Feb. 11 – Feb. 12 **Deputy scientific attaché, French Embassy in Austria**
Monitoring of Austrian science and technology, writing out articles and reports. Aid to the animation of the French cultural institute in Vienna (organization of conferences, seminars, ...). Information diffusion (fact sheets, flyers, brochures).
- 2010
Jan. – June **Master's Thesis at the KTH department of Astroparticle Physics**
"Study of the X-Ray Variability of the Black Hole Binary GX 339-4"
Analysis (using Mathematica) and interpretation within the framework of existing theories of a set of raw data collected by the RXTE satellite.
- 2008
June – Aug. **Internship at the Institute of Industrial Science, University of Tokyo, Japan**
"Simulating a Small Neuron Network"
Numerical simulations (using Scilab) and analysis of small neuron networks, based on existing mathematical models of neurons.

Languages

- | | |
|-----------------|---|
| French | Mother tongue |
| English | Fluent (106/120 at internet-based TOEFL in 2008, M. Sc. performed in English) |
| German | Conversational German, good reading comprehension |
| Japanese | Conversational Japanese, elementary reading and writing |
| Swedish | Skilled |

Interests and Competences

- | | |
|--------------------------|--|
| Computer literacy | C/C++, PHP/MySQL/HTML, Windows and Linux-based systems. Microsoft Word, PowerPoint and Excel, Wolfram Mathematica. |
| Interests | Music (guitar, piano, composing), sports (football), travelling |

Gómez Díaz Luis Gabriel

Position: Ph.D student

Period covered: 2013-2017



I Scientific Work

Astrophysical implications of the fermionic dark matter in galaxies

It has been recently shown [Ruffini, Argüelles, Rueda, 2015] that a self-gravitating system of massive keV fermions in thermodynamic equilibrium successfully describes the dark matter (DM) halos from dwarf to big spiral galaxies, and predicts the existence of a denser quantum core towards the center of the configuration. This quantum feature related to its fermionic nature may lead to interesting effects observable in our local Universe. Starting from that, I am working in different scenarios in which the fermionic DM effects can be tested by upcoming surveys. First, I am re-examining the assumptions in which the phase-space density (PSD) has been used to constraint the DM particle mass by both theory and simulations. As a first result, I show that the quantum nature increases the PSD modifying the bounds for the fermionic DM particle mass. Second, I am analyzing the role of these particles in the structure formation specifically at small scales where the CDM cosmological model suffers some problems indicating significant discrepancies with astrophysical observations. On the other hand, the intrinsic orbital period decay of relativistic binary pulsars (with characteristic orbital period 0.1 days) are completely accounted for gravitational waves emission with an unprecedented precision. We show however in a current work that, for periods larger than 20 days, the orbital period decay can be described instead by dynamical friction of dark matter (DM), when the pulsar and its companion interact with their respective wakes such that a change in its orbital motion is produced. The scale orbital period at which this effect can be accounted, depends sensibly on the DM density profile.

Finally I successfully defended my Ph.D thesis the last October 9th 2017 at the Sapienza university of Rome, awarded the Doctor of Philosophy degree.

II Conferences and educational activities

II a Conferences and Other External Scientific Work

- IRAP Ph.D. Erasmus Mundus school. 2-20 September 2013. Nice (France).
- IRAP-PhD Erasmus Mundus School, “Nice Winter School”: 23 February - 2 March 2014. Nice (France).
- IRAP Ph.D. Erasmus Mundus Workshop: Supernovae, Gamma-ray bursts and the induced gravitational collapse, May 11-16, 2014 - Les Houches (France).
- IRAP Ph.D. Erasmus Mundus school “Third Bego Rencontres” 8-19 September 2014- Nice (France).

- *1st Scientific ICRANet Meeting in Armenia: Black Holes: the largest energy sources in the Universe. 30 June - 4 July 2014 – Yerevan (Armenia).*
- *Ecole Internationale Daniel Chalonge Workshop CLAS Meudon 2014: From Large to small scale in agreement with observations: CMB, WDM, Galaxies, Black holes, Neutrinos and sterile Neutrinos. 4-6 June 2014- Observatoire de Paris, Chateau de Meudon CLAS (France).*
- *The Second ICRANet César Lattes Meeting: Niterói - Rio De Janeiro, April 13-18 - João Pessoa, April 21 - Recife - Fortaleza, April 22, 2015 (Brazil).*
- *Fourteenth Marcel Grossmann Meeting - MG14, University of Rome "La Sapienza" - Rome, July 12-18, 2015 (Italy).*
- *Centenary Celebration of General Relativity Theory: Andean School on Gravity and Cosmology. 17-21 November 2015, Bogotá (Colombia).*
- *The 1st Colombia-ICRANet Julio Garavito Armero Meeting. 23-25 November- Bucaramanga, 26-27 November 2015 - Bogotá (Colombia).*
- *From theory to applications: Celebrating a century of gravitational lensing. University of Leiden - Leiden, the Netherlands. July 11-15, 2016.*
- *Fourth Bego Rencontres IRAP Ph.D. Erasmus Mundus school. Villa Ratti,- Nice, France. May 30th - June 3rd, 2016*
- *Supernovae, Hypernovae and Binary Driven Hypernovae An Adriatic Workshop International Center for Relativistic Astrophysics Network-ICRANet . Pescara - June 20-30, 2016.*

II b Work With Students

II c Diploma thesis supervision

II d Other Teaching Duties

II e. Work With Postdocs

III. Service activities [*activities carried out in collaboration with ICRANet (e.g. teaching activities, conferences etc...) and outside ICRANet (teaching activities in your university etc...)*]

III a. Within ICRANet

III b. Outside ICRANet

Mobility period: Center of Applied Space technology and microgravity- ZARM, Bremen University. 3 June - 28 September 2015. 30 March - 30 May, 2016.

IV. Other

2017 List of Publication

L. Gabriel Gómez, J. A. Rueda. *Dark matter dynamical friction versus gravitational wave emission in the evolution of compact star binaries*. Phys. Rev. D. 96, 063001, (2017).

L. Gabriel Gómez and Jorge A. Rueda, *A possible effect of quantum cores of massive fermions on the non-linear matter power spectrum of sub-halos*. The Fourteenth Marcel Grossmann Meeting. World Scientific proceedings, pp. 2473-2478. ISBN: 978-981-3226-59-3 (2017).

A. Krut, C. R. Argüelles, **L. Gabriel. Gómez**, J. A. Rueda and R. Ruffini. *Dark matter phase-space density distribution in dwarf spheroidal galaxies*. The Fourteenth Marcel Grossmann Meeting. World Scientific proceedings, pp. 2503-2508. ISBN: 978-981-3226-59-3 (2017).

Gregoris Daniele

Position: Postdoctoral fellow at Dalhousie University (Halifax, Canada) within the AARMS program since 1st June 2015

Period covered: 1st January – 11th November 2015

I Scientific Work

My scientific interests are:

- Application on the nonideal equation of state of Shan-Chen in cosmology
- Application of black hole lattices in cosmology
- Equivalence problem in General Relativity
- Geroch transform in General Relativity
- Averaging problem in General Relativity

II Conferences and educational activities

II a Conferences and Other External Scientific Work

II b Work With Students

I have been working with the students of the research group of Prof. Alan Coley to which I belong at Dalhousie University

II c Diploma thesis supervision

II d Other Teaching Duties

I gave two lectures of the course Math 1010 in the Fall term at Dalhousie University

II e. Work With Postdocs

III. Service activities [*activities carried out in collaboration with ICRANet (e.g. teaching activities, conferences etc...) and outside ICRANet (teaching activities in your university etc...)*]

III a. Within ICRANet

Talks at international conferences:

“Application of black hole lattices in relativistic cosmology”,

Second Cèsar Lattes meeting, Rio de Janeiro, 13th - 18th April 2015

“Applications of the nonideal Shan-Chen equation of state in cosmology”,
International Conference on Gravitation and Cosmology, the fourth Galileo-
Xu Guangqi meeting, Kavli Institute for Theoretical Physics China at the
Chinese Academy of Sciences (KITPC) Beijing - China May 4-8, 2015

III b. Outside ICRANet

Visitor, Queen Mary University London (22nd - 28th March 2015)

Talk:

“Application of black hole lattices in relativistic cosmology”,
St. Francis Xavier University, Antigonish (Canada), October 15, 2015

IV. Other

2015 List of Publication

Proceedings:

T. Clifton, D. Gregoris, K. Rosquist, “Application of black hole lattices
in relativistic cosmology”, submitted as proceeding for the 2CL meeting

On referred journals:

D. Bini, A. Geralico, D. Gregoris, P. Mocz, S. Succi, “CMB constraints on cosmological models with
fluids obeying a Shan-Chen-like equation of state”, submitted to Physics Letters B

Gruber Christine



Position: PhD Student

Period covered: September 2010 - present

I Scientific Work

- Dark energy from vacuum energy contributions of bosonic and fermionic fields in the universe;
- Improvements and extensions of cosmographical analyses of supernova data in order to obtain the parameters of the cosmographic series;
- Bose-Einstein condensation in compact astrophysical objects such as white dwarfs and neutron stars.

II Conferences and educational activities

Conferences and Other External Scientific Work

2013, May – July: Research Stay at ICRANet Pescara, Italy

2012, September 3rd-22nd: “Dark Energy from the Vacuum Energy of Quantum Fields” and “Bose-Einstein Condensation in Astrophysical Compact Objects”, talks at the Erasmus Mundus School, Université de Nice Sophia-Antipolis, Nice, France

2012, August 21st-25th: “Bose-Einstein Condensation in Astrophysical Compact Objects”, poster contribution at the 514th WE-Heraeus Seminar “Quo vadis, BEC?”, Bad Honnef, Germany

2012, May – July: Research Stay at ICRANet Pescara, Italy.

2012, July 3rd: “Cosmography and constraints on the equation of state of the Universe in various parameterizations”, talk at 13th Marcel Grossmann Meeting, Stockholm, Sweden

2012, January 2nd: “Dark Energy from the Vacuum Energy of Quantum Fields”, talk at the New Year’s Seminar of AG Kleinert, FU Berlin, Germany

2011, September 5th-17th: “Dark Energy in the Gross-Neveu model”, talk at the Erasmus Mundus Summer School, Université de Nice Sophia-Antipolis, Nice, France

Work With Students

Summer internship RISE (Research Internships in Science and Engineering): supervision of a Bachelor student for a summer internship (June – August 2011, June-August 2013).

Other Teaching Duties

Free University Berlin: Fall term 2010/11: Tutorial for Theoretical Physics III: Electrodynamics
 Fall term 2011/12: Tutorial for Theoretical Physics III: Electrodynamics

2013 List of Publications

A. Aviles, C. Gruber, O. Luongo, H. Quevedo, "Constraints from Cosmography in various parametrizations", arXiv:[astro-ph.CO]1301.4044, proceedings to MGXIII.

Karlica Mile

Position: EMJD PhD student
Period covered: 2014 - now



I Scientific Work

Development of numerical codes for solving the kinetic equation and calculation of non-thermal spectra with the special interest to GRB afterglow. In this past year we constructed the paradigm of “sponge” model which includes the influence of ejecta fragmentation on the form of GRB afterglow lightcurve.

II Conferences and educational activities

II a Conferences and Other External Scientific Work

- 2nd Cesar Lattes Meeting, Rio de Janeiro, Brazil, April 13-22, 2015
- Fourteenth Marcel Grossmann Meeting, Rome, Italy, July 12-18, 2015

III. Service activities [*activities carried out in collaboration with ICRANet (e.g. teaching activities, conferences etc...) and outside ICRANet (teaching activities in your university etc...)*]

III a. Within ICRANet

- Talk at 2nd Cesar Lattes Meeting, Rio de Janeiro, Brazil, April 13-22, 2015 with the title: Synchrotron Radiation and GRB Perspective – A Short Review
- Talk at Fourteenth Marcel Grossmann Meeting, Rome, Italy, July 12-18, 2015 with the title: “Sponge Model” As The Hydrodynamical Background For GRB Afterglow Phase

III b. Outside ICRANet

IV. Other

2015 List of Publication

- Dumbović, M., Vršnak, B., Čalogović, J., Karlica, M. (2011). ‘Cosmic ray modulation by solar wind disturbances’. *Astronomy and astrophysics*, 531, A91-1-A91-17.

Kovačević Miloš

Position: PhD student

Period covered: 2013-2016/17/18



I Scientific Work

Application and analysis of the Induced Gravitational Collapse in some GRBs-SNe

II Conferences and educational activities

Erasmus Mundus School, Nice, France 02-20 September 2013

Erasmus Mundus School, Nice, France 23 February - 02 March 2014

School of Physics - Les Houches, France 10-16 May 2014

1st Scientific ICRANet Meeting in Armenia, Yerevan, Armenia 30 June – 4 July 2014

Erasmus Mundus School, Nice, France 08-19 September 2014

Fourteenth Marcel Grossmann Meeting (MG14), Rome, Italy 12-18 July, 2015

14th Italian-Korean Symposium on Relativistic Astrophysics, Pescara, Italy 20-24 July, 2015

Erasmus Mundus School, Nice, France 30 May – 03 June, 2016

14th Italian-Korean Symposium on Relativistic Astrophysics, Seoul, Korea 03-07 July, 2017

List of Publication

- Ruffini, R.; Muccino, M.; Bianco, C. L.; Enderli, M.; Izzo, L.; Kovačević, M.; Penacchioni, A. V.; Pisani, G. B.; Rueda, J. A.; Wang, Y. (2014). On binary-driven hypernovae and their nested late X-ray emission. *A&A*, 565, L10.
- Ruffini, R.; Izzo, L.; Muccino, M.; Pisani, G. B.; Rueda, J. A.; Wang, Y.; Barbarino, C.; Bianco, C. L.; Enderli, M.; Kovačević, M. (2014). Induced gravitational collapse at extreme cosmological distances: the case of GRB 090423. *A&A*, 569, A39.
- Kovačević, M.; Izzo, L.; Wang, Y.; Muccino, M.; Della Valle, M.; Amati, L.; Barbarino, C.; Enderli, M.; Pisani, G. B.; Li, L. (2014). A search for Fermi bursts associated to supernovae and their frequency of occurrence. *A&A*, 569, A108.

- Ruffini, R.; Wang, Y.; Enderli, M.; Kovačević, M.; Bianco, C. L.; Muccino, M.; Penacchioni, A. V.; Pisani, G. B.; Rueda, J. A. (2015). GRB 130427A and SN 2013cq: A Multi-wavelength Analysis of an Induced Gravitational Collapse Event. *ApJ*, 798, 10.
- Ruffini, R.; Muccino, M.; Kovačević, M.; Oliveira, F. G.; Rueda, J. A.; Bianco, C. L.; Enderli, M.; Penacchioni, A. V.; Pisani, G. B.; Wang, Y. (2015). GRB 140619B: a short GRB from a binary neutron star merger leading to black hole formation. *ApJ*, 808, 190.
- Ruffini, R.; Rueda, J. A.; Muccino, M.; Aimuratov, Y.; Becerra, L. M.; Bianco, C. L.; Kovacevic, M.; Moradi, R.; Oliveira, F. G.; Pisani, G. B.; Wang, Y. (2016). On the Classification of GRBs and Their Occurrence Rates. *ApJ*, 832, 136R.
- Pisani, G. B.; Ruffini, R.; Aimuratov, Y.; Bianco, C. L.; Kovačević, M.; Moradi, R.; Muccino, M.; Penacchioni, A. V.; Rueda, J. A.; Shakeri, S.; Wang, Y. (2016). On the Universal Late X-Ray Emission of Binary-driven Hypernovae and Its Possible Collimation. *ApJ*, 833, 159.
- Ruffini, R.; Muccino, M.; Aimuratov, Y.; Bianco, C. L.; Cherubini, C.; Enderli, M.; Kovačević, M.; Moradi, R.; Penacchioni, A. V.; Pisani, G. B.; Rueda, J. A.; Wang, Y. (2016). GRB 090510: A Genuine Short GRB from a Binary Neutron Star Coalescing into a Kerr-Newman Black Hole. *ApJ*, 831, 178.
- Ruffini, R.; Aimuratov, Y.; Becerra, L.; Bianco, C. L.; Chen, Y. C.; Karlica, M.; Kovacevic, M.; Melon Fuksman, J. D.; Moradi, R.; Muccino, M.; Pisani, G. B.; Primorac, D.; Rueda, J. A.; Wang, Y. (2017). On the nature of prompt emission, X and gamma ray flares and extended thermal emission in GRB 151027A. Submitted to *ApJ*.
- Ruffini, R.; Wang, Y.; Aimuratov, Y.; Barres de Almeida, U.; Becerra, L.; Bianco, C. L.; Chen, Y. C.; Karlica, M.; Kovacevic, M.; Li, L.; Melon Fuksman, J. D.; Moradi, R.; Muccino, M.; Penacchioni, A. V.; Pisani, G. B.; Primorac, D.; Rueda, J. A.; Shakeri, S.; Vereshchagin, G. V.; Xue, S.-S. (2018). Early X-Ray Flares in GRBs. *ApJ*, 852, 53R.

Krut, Andreas

Position: PhD (EMJD)

Period covered: 3 years



I Scientific Work

Dark matter and galaxy structures

II Conferences and educational activities

II a Conferences and Other External Scientific Work

- XIII International Conference on Gravitation, Astrophysics and Cosmology & 15th Italian-Korean Symposium on Relativistic Astrophysics (Seoul, July 3-7, 2017)
- 5th Galileo-Xu Guangqai Meeting (Chengdu, June 25-30, 2017)
- Supernovae, Hypernovae and Binary Driven Hypernovae, An Adriatic Workshop (Pescara, June 20-30, 2016)
- Forth Bego Rencontres, IRAP Ph.D. Erasmus Mundus school (Nice, September 8-19, 2016)
- 6th Les Houches school in numerical physics, International School of Computational Astrophysics (Les Houches, May 16-27, 2016)
- Astrophysical Probes of Fundamental Physics, A PhD School at University of Ferrara (Ferrara, September 7-11, 2015)
- 14th Italian-Korean Symposium on Relativistic Astrophysics (Pescara, July 20-24, 2015)
- 14th Marcel Grossmann Meeting (Rome, July 12-18, 2015)
- 2nd César Lattes Meeting (Rio de Janeiro, April 13-22, 2015)
- Third Bego Rencontres, IRAP Ph.D. Erasmus Mundus school (Nice, September 8-19, 2014)

II b Work With Students - none

II c Diploma thesis supervision - none

II d Other Teaching Duties - none

II e. Work With Postdocs - none

III. Service activities [activities carried out in collaboration with ICRANet (e.g. teaching activities, conferences etc...) and outside ICRANet (teaching activities in your university etc...)]

III a. Within ICRANet

IV. Other

2018 List of Publication

- **Study of mass discrepancy relations in disk-galaxies with different dark matter models**
A. Krut, C. R. Argüelles, J. A. Rueda and R. Ruffini
in preparation
- **Novel constraints on fermionic dark matter from galactic observables**
C. R. Argüelles, A.Krut, J. A. Rueda and R. Ruffini
MNRAS (submitted), arXiv:1606.07040

Liccardo Vincenzo

Position: Post-doc at ITA-Instituto Tecnológico de Aeronautica, Sao Jose dos Campos, SP, Brasil.
Period covered: November 2014 – November 2017

I Scientific Work

My activity concerns the development and tests of electromechanical transducers for the Brazilian gravitational wave detector “Mario Schenberg”, under supervision of Prof. Odylio D. Aguiar. The detector, which is being built by the GRAVITON group of INPE (National Institute for Space Research), basically consists of a spherical resonant mass with nine parametric transducers, of reentrant cavity type, which monitor its fundamental modes of vibration. The detector resonant frequency is 3.2 kHz with a bandwidth of 400 Hz and it is located at the University of Sao Paulo. When coupled to the antenna, the transducer-sphere system will work as a mass-spring system with three modes, where the first will be constituted by the antenna effective mass, the second will be constituted by the mechanical structure of the transducer, and the third one will be constituted by a membrane that will close the transducer microwave cavity and modulate it around 3.2 kHz

The main tasks will be the optimization, test and assembling of a new parametric transduction system, based on superconducting reentrant cavities with high electrical Q-factor (Q). High Q values will allow us to reach the quantum limit of detector sensitivity of $\sim 10^{22} \text{ Hz}^{-1/2}$ in the near future, making it possible to search for gravitational waves around 3.2 kHz.

II Conferences and educational activities

II a Conferences and Other External Scientific Work

- SPIE Astronomical Telescopes + Instrumentation 2016 Conference, June 26 - July 1, 2016, Edinburgh (Scotland);
- XXXIII Encontro de Física 2016 - Sociedade Brasileira de Física, September 3-7, 2016, Natal (Brazil);
- 7th International Workshop on Astronomy and Relativistic Astrophysics - IWARA 2016, October 9-13, 2016, Gramado (Brazil);

II b Work With Students

Type: Iniciação Científica

Student: Manoel Gumes,

Title: “Astrofísica nuclear: origem dos elementos e produção de elementos pesados”,

Agency: CAPES

Period: May 2016 – May 2017

II c Diploma thesis supervision

Type: Thesis Coorientation

Student: Ivana Cunha

Title: “Noise analysis of the Schenberg detector”,

Start Period: October 2016

III. Service activities

III a. Within ICRANet

III b. Outside ICRANet

IV. Other

2016 List of Publication

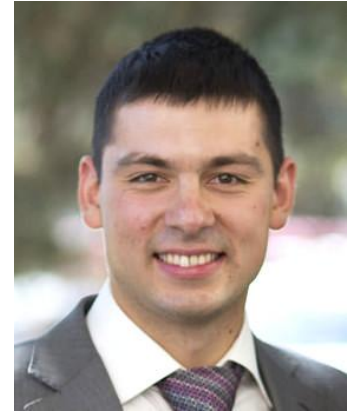
- Development of superconducting Klystron cavity for the Mario Schenberg gravitational wave detector, V. Liccardo, O. D. Aguiar, E. K. de Franca. [Proceedings of the MG14 Meeting on General Relativity, Singapore: World Scientific], (2016); (arXiv:1511.05902)
- The LAUE project: latest developments, V. Liccardo, E. Virgili, F. Frontera, P. Rosati. [Journal of Physics: Conference Series 706 (2016) 052037], (2016); doi:10.1088/1742-6596/706/5/052037

- Study of the effect of NbN on microwave Niobium cavities for Gravitational Wave Detectors, V. Liccardo, E. K. Franca, O. D. Aguiar, R. M. Oliveira, K. L. Ribeiro, and M. M. N. F. Silva. [Journal of Instrumentation], Vol. 11, No. 07 (2016); doi:10.1088/1748-0221/11/07/P07004

- Optimization of high sensitivity parametric transducers for the Gravitational Wave Detector ”Mario Schenberg”, V. Liccardo, E. C. Ferreira, O. D. Aguiar and R. M. Oliveira [Society of Photo-Optical Instrumentation Engineers SPIE Conference Series], Vol. SPIE 9912, (2016); doi:10.1117/12.2235867

- Simulation of a Laue lens with bent Ge(111) crystals, E. Virgilli, V. Valsan, V. Liccardo, F. Frontera, E. Caroli, J. B. Stephen. [Manuscript submitted for publication to JATIS], (2016);

Lisakov Sergey



Position: PhD student

Period covered: Sept 2013 – Nov 2016

I Scientific Work

Thesis: Core-collapse supernovae and their progenitors

All stars with an initial mass greater than 8 solar masses, but not massive enough to encounter the pair-production instability, eventually form a degenerate core and collapse to form a compact object, either a neutron star or a black hole. At the lower mass end, these massive stars die as red-supergiant stars and give rise to Type II supernovae (SNe). The diversity of observed properties of SNe II suggests a range of progenitor mass, radii, but also explosion energy.

We have performed a large grid simulations designed to cover this range of progenitor and explosion properties. Using MESA STAR, we compute a set of massive star models (12–30 solar masses) from the main sequence until core collapse. We then generate explosions with V1D to produce ejecta within a range of explosion energies and yields. Finally, all ejecta are evolved with CMFGEN to generate multi-band light curves and spectra.

In this work, we focus our attention on the properties of low-energy explosions that give rise to low-luminosity Type II Plateau (II-P) SNe. Such low-energy explosions, characterized by low ejecta expansion rates, are more suitable for reliable spectral line identifications. Based on our models, we discuss the distinct signatures of low-energy explosions in lower and higher mass models. One important goal is to identify whether there is a progenitor-mass bias leading to such events.

II Conferences and educational activities

II a Conferences and Other External Scientific Work

June 2016

IV Bego Rencontre EMJD IRAP, Nice, France.

Oral talk «Core-collapse supernovae and their progenitors»

August 2015

IAU XXIX General Assembly, Honolulu, USA. Poster presentation «A study of low luminosity Type II-P supernova 2008bk»

July 2015

Conference XIV Marcel Grossmann Meeting — MG14, Rome, Italy. Poster presentation «A study of low luminosity Type II-P supernova 2008bk»

June 2014

Conference «New windows on massive stars: asteroseismology, interferometry and spectropolarimetry», Geneva, Swiss

August 2014

«Supernovae in the local Universe: celebrating 10,000 days of supernova 1987a», Coffs-Harbour, Australia

September 2014

Erasmus Mundus Joint Doctorate School, Les Houches, France

May 2014

Erasmus Mundus Joint Doctorate School, Nice, France

September 2013

Erasmus Mundus Joint Doctorate School, Nice, France

May 2012

Public conference «Heading to the Space», invited speaker, Moscow, Russia

IV. Other

2016 List of Publication

1. Pruzhinskaya M. V. & Lisakov S. M., «Supernovae stars — the base of the observational cosmology», Journal of Astronomical History and Heritage, 19(2), 203-215.
2. Lisakov S. M. et al., «A study of low luminosity Type II-P supernova 2008bk», accepted in MNRAS

Ludwig Hendrik

Position: PhD student

Period covered: 01.01.2016 – 29.02.2016



I Scientific Work

Thesis defense 29.2.2016

II Conferences and educational activities

II a Conferences and Other External Scientific Work

II b Work With Students

II c Diploma thesis supervision

II d Other Teaching Duties

II e. Work With Postdocs

III. Service activities

III a. Within ICRANet

III b. Outside ICRANet

IV. Other

2016 List of Publication

Maiolino Tais

Position: Ph.D Student

Period covered: 2013-2017



I Scientific Work

Exploring outflows as origin of red-skewed iron lines in compact objects

II Conferences and educational activities

II Conferences and Other External Scientific Work

- Journées PNHE 2016, 30th-31st March 2016, Paris (France)
- *Physics of the Universe in X-rays*, CNRS, 23rd-28th May 2016, Observatoire de Haute-Provence (OHP) (France)

2017 List of Publication

No publications

MARTINEZ AVILES GERARDO

Position: PhD (defended October 12th 2017)
Observatoire de la cote d'azur, Nice, France

Period covered: September 2014 – October 2017



I Scientific Work

During the third year of my PhD, under the supervision of Dr. Chiara Ferrari (Observatoire de la côte d'azur) I completed the analysis of radio data using the Australian Telescope Compact Array (ATCA) of seven galaxy clusters, the largest gravitationally bound structures in the Universe. The focus of this project was the search for understanding the nature of Mpc-scale diffuse radio sources, coined Radio Halos. The work completed during my PhD includes the publication of a paper as first author in the journal *Astronomy & Astrophysics*: "ATCA observations of the MACS-Planck Radio Halo Cluster Project - I. New detection of a radio halo in PLCK G285.0-23.7", *Martinez-Aviles, Ferrari et al. 2016*. In the paper we report the discovery of a Giant Radio Halo in a massive galaxy cluster, located at redshift $z=0.39$. We also published a second paper "ATCA observations of the MACS-Planck Radio Halo Cluster Project – II. Radio observations of intermediate redshift ATCA cluster sample". *Martinez-Aviles, Johnston-Hollit et. al. 2017*. In this second paper we present the results of the observations of a sample of 7 intermediate redshift ($z=0.3 - 0.44$) massive galaxy clusters. My PhD thesis was successfully defended on October 12th 2017.

As part of the mobility opportunities provided by the International Relativistic Astrophysics PhD (IRAP) programme, I spent 5 months (February – June 2016) in the INAF-Osservatorio di Radioastronomia in Bologna, Italy. To work with a group of expert theoreticians and observers in the field. I also attended the prestigious Vatican Observatory Summer School VOSS 2016, to widen my scientific interests and extend my academic contacts.

II Conferences and educational activities

II a Conferences and Other External Scientific Work

June 2016	Vatican Observatory Summer School, Castel Gandolfo, Italy
February-May 2016	Research visit in Istituto di Radioastronomia, Bologna, Italy
December 2015	Journées Nationales PNCG, Nice, France
October 2015	Exoplanetary atmospheres and habitability, Nice, France
September 2015	Sixth European Radio Interferometry School ERIS 2015, Garching, Germany
June-August 2015	Research visit in Victoria University, Wellington, New Zealand

January 2015 Research visit in Victoria University, Wellington, New Zealand

November 2014 3rd LOFAR Data processing school, Dwingeloo, Netherlands

III. Service activities

IV. Other

List of Publications

- *ATCA observations of the MACS-Planck Radio Halo Cluster Project – II. Radio observations of an intermediate redshift cluster sample.* G. Martinez Aviles, M. Johnston-Hollit et al. Astronomy & Astrophysics 2017
- *Sub-structure and merger detection in resolved NIKA Sunyaev-Zel'dovich images of distant clusters.* R. Adam, O. Hahn, F. Ruppin, ... , G. Martinez Aviles et al. Astronomy & Astrophysics 2017
- *ATCA observations of the MACS-Planck Radio Halo Cluster Project - I. New detection of a radio halo in PLCK G285.0-23.7.* G. Martinez Aviles, C. Ferrari, M. Johnston-Hollit et al. Astronomy & Astrophysics 2016; doi:10.1051/0004-6361/201628788
- *"Grandeur in this view of life": N-body simulation models of the Galactic habitable zone* B.Vukotic; D.Steinhauser; G.Martinez-Aviles et al. Monthly Notices of the Royal Astronomical Society 2016; doi: 10.1093/mnras/stw829

Martins de Carvalho Sheyse

Position: PosDoc at Universidade Federal Fluminense (Brazil)
Period covered: 2013-2015



I Scientific Work

a – White Dwarfs: The Feynman-Metropolis-Teller (FMT) treatment considering a classic non-relativistic Thomas-Fermi model confined in a Wigner-Seitz cell has been recently generalized to relativistic regimes and applied to the description of non-rotating white-dwarfs in general relativity. We extended the FMT treatment to the case of finite temperatures for white dwarfs with different nuclear compositions. Our aim is to understand the effects of finite temperatures on the structure of white dwarfs, constructing and analyzing their equation of state and mass-radius relation.

b – Thermal Evolution of Neutron Stars: It is known that their cooling evolution could reveal crucial information on the properties of matter at high density and pressure. So, the modeling of the thermal structure evolution together with its observation allow us, to probe the microscopic and macroscopic properties of neutron stars. The observed properties of neutron stars are extremely sensitive to the star's composition. Taking account the analysis of these properties, it is possible to constrain the equation of state of dense matter and its composition. We explore a new model for the inner structure of neutron stars formulated by Belvedere et al.(2012), where it is considered the condition of global charge neutrality instead of local charge neutrality, which changes the star's structure and composition.

II Conferences and educational activities

II a Conferences and Other External Scientific Work

- The second ICRANet César Lattes Meeting

II b Work With Students

- Globally – neutral neutron star and strange star cooling comparison

student: Ibsen Gomes, Universidade Federal Fluminense

II c Diploma thesis supervision

II d Other Teaching Duties

II e. Work With Postdocs

III. Service activities

III a. *Within ICRANet*

III b. *Outside ICRANet*

IV. Other

2015 List of Publication

-Title: *Thermal Evolution of Hybrid stars within the framework of a non-local NJL model.*

Authors: *S. M. de Carvalho, R. Negreiros, M. Orsaria, G. A. Contrera, F. Weber and W. Spinella.*

Published at *Physical Rev. C* – DOI: 10.1103/PhysRevC.92.035810

-Title: *Thermal X-Ray emission from massive, fast rotating, highly magnetized white dwarf.*

Authors: *D.L. Cáceres, Jaziel G. Coelho, S. M. de Carvalho, R.C.R. de Lima, J. Rueda and R. Ruffini.*

To be submitted.

List of publications:

- *On the cooling of globally-neutral neutron star. Journal of the Korean Physical Society. V.65, p.861-864, 2014.*

Authors: *S. M. de Carvalho, Jorge A. Rueda and Remo Ruffini.*

- *Relativistic Feynman- Metropolis- Teller treatment at finite temperatures. Physical Review C. V.89, p. 015801, 2014.*

Authors: *S. M. de Carvalho, M. Rotondo, Jorge A. Rueda and Remo Ruffini.*

- *Thermal evolution of neutron stars with global and local neutrality. Physical Review C. v.90, p. 0055804, 2014.*

Authors: *S. M. de Carvalho, R. Negreiros, Jorge A. Rueda and Remo Ruffini.*



Position: Post-doc

Period covered: 01/01/2014 to 31/12/2015

I Scientific Work

My post-doc research concentrated on the development of the space experiment MIRAX (Monitor e Imageador de RAios X), and a balloon-borne coded-mask experiment, protoMIRAX, that will serve as a prototype for testing the detectors and instrumentation in general. The energy range covered by the detectors is 10-200 keV for MIRAX and 30-200 keV for protoMIRAX. The detectors are 169 in total, distributed in a plane, in a 13 x 13 array. The experiment uses a coded mask with a MURA pattern (Uniformly Redundant Array) which is a 2 x 2 extension of the 13 x 13 pattern, minus one line and one column (25 x 25).

My work was to characterize and calibrate the X-ray detectors. I developed a program in order to acquire and analyze the data. The main astrophysical sources that will be observed by MIRAX are the Crab Nebula and three sources in the Galactic Centre region. I also helped to simulate the diffuse background and to reconstruct the images of the sources as will be seen by MIRAX. To do this we made use of the GEANT4 package, developed by CERN. The aim was to simulate every interaction of the incoming particles with the detectors and other parts of the experiment, and to generate shadowgrams (plots of the number of counts that reached each of the detectors). From these shadowgrams and applying a deconvolution procedure we obtained the images and were able to calculate the signal-to-noise ratio (SNR).

II Conferences and educational activities

II a Conferences and Other External Scientific Work

2014 **XXXVIII Reunião Anual da Sociedade Astronômica Brasileira, Armação dos Búzios, Brazil**, August, 31st - September, 4th, Poster: *Simulações de imagens de fontes brilhantes com o experimento protoMIRAX*, Authors: Penacchioni, A.V., Braga, J., Castro, M.A, D'Amico, F.

2015 **XIII International Workshop on Hadron Physics, Angra dos Reis, Brazil**, March, 22nd - 27th, Poster: *Telescope performance and image simulations of the balloon-borne coded-mask protoMIRAX experiment*, Authors: Penacchioni, A.V., Braga, J., Castro, M.A, D'Amico, F.

2015 2nd **Cesar Lattes Meeting, Niterói & Rio de Janeiro, Brazil**, April, 13th - 18th, Oral presentation: *Telescope performance and image simulations of the coded-mask balloon-borne protoMIRAX experiment*.

2015 **XIV Marcel Grossmann Meeting, Rome, Italy**, July, 13th -18th, Oral presentation: *Telescope performance and image simulations of the coded-mask balloon-borne experiment protoMIRAX*.

2015 **High Energy Phenomena in Relativistic Outflows (HEPRO) V**, La Plata, Argentina, October, 5th-8th, Oral presentation: *Estimating GRB detection rate with MIRAX*.

II b Work With Students

II c Diploma thesis supervision

II d Other Teaching Duties

II e. Work With Postdocs

III. Service activities [*activities carried out in collaboration with ICRANet (e.g. teaching activities, conferences etc...) and outside ICRANet (teaching activities in your university etc...)*]

III a. Within ICRANet

2015 **XIV Marcel Grossmann Meeting, Rome, Italy, July, 13th -18th**, Oral presentation: *Telescope performance and image simulations of the coded-mask balloon-borne experiment protoMIRAX*.

III b. Outside ICRANet

IV. Other

2015 List of Publication

Publications in international journals

2015 **GRB 130427A and SN 2013cq: A Multi-wavelength Analysis of An Induced Gravitational Collapse Event**, Ruffini, R.; Wang, Y.; Kovacevic, M.; Bianco, C. L.; Enderli, M.; Muccino, M.; Penacchioni, A. V.; Pisani, G. B.; Rueda, J. A., ApJ, 798, 10R, DOI: [10.1088/0004-637X/798/1/10](https://doi.org/10.1088/0004-637X/798/1/10).
<http://adsabs.harvard.edu/abs/2015ApJ...798...10R>

2015 **Telescope performance and image simulations of the balloon-borne coded- mask protoMIRAX experiment**, Penacchioni, A.V., Braga, J., Castro, M., D'Amico, F., Journal of High Energy Astrophysics, Volume 5, p. 22-29, DOI: [10.1016/j.jheap.2015.01.001](https://doi.org/10.1016/j.jheap.2015.01.001).
<http://adsabs.harvard.edu/abs/2015JHEAp...5...22P>

2015 **The protoMIRAX hard X-ray imaging balloon experiment**, Braga, J.; D'Amico, F.; Avila, M. A. C.; Penacchioni, A. V.; Sacabui, J.R.; de Santiago, V. A.; Mattiello- Francisco, F.; Strauss, C.; Fialbo, M. A. A., A&A, Volume 580, id.A108, 9 pp, DOI: [10.1051/0004-6361/201526343](https://doi.org/10.1051/0004-6361/201526343).
<http://adsabs.harvard.edu/abs/2015A%26A...580A.108B>

2015 **On binary driven hypernovae and their nested late X-ray emission**, Muccino, Marco; Ruffini, Remo; Bianco, Carlo Luciano; Enderli, Maxime; Kovacevic, Milos; Izzo, Luca; Penacchioni, Ana Virginia; Pisani,

Giovanni Battista; Rueda, Jorge A.; Wang, Yu, Astronomy Reports, Volume 59, Issue 7, pp.581-590, DOI: [10.1134/S1063772915070070](https://doi.org/10.1134/S1063772915070070).

<http://adsabs.harvard.edu/abs/2015ARep...59..581M>

2015 **Induced gravitational collapse in the BATSE era: The case of GRB 970828**, *Ruffini, R.; Izzo, L.; Bianco, C. L.; Rueda, J. A.; Barbarino, C.; Dereli, H.; Enderli, M.; Muccino, M.; Penacchioni, A. V.; Pisani, G. B.; Wang, Y.*, Astronomy Reports, Volume 59, Issue 7, pp.626-638, DOI: [10.1134/S1063772915070094](https://doi.org/10.1134/S1063772915070094). <http://adsabs.harvard.edu/abs/2015ARep...59..626R>

2015 **Predicting supernova associated to gamma-ray burst 130427a**, *Wang, Y.; Ruffini, R.; Kovacevic, M.; Bianco, C. L.; Enderli, M.; Muccino, M.; Penacchioni, A. V.; Pisani, G. B.; Rueda, J. A.*, Astronomy Reports, Volume 59, Issue 7, pp.667- 671, DOI: [10.1134/S1063772915070148](https://doi.org/10.1134/S1063772915070148). <http://adsabs.harvard.edu/abs/2015ARep...59..667W>

2015 **GRB 140619B: a short GRB from a binary neutron star merger leading to black hole formation**, *Ruffini, R.; Muccino, M.; Kovacevic, M.; Oliveira, F. G.; Rueda, J. A.; Bianco, C. L.; Enderli, M.; Penacchioni, A. V.; Pisani, G. B.; Wang, Y.; Zaninoni, E.*, The Astrophysical Journal, Volume 808, Issue 2, article id. 190, 14 pp, DOI: [10.1088/0004-637X/808/2/190](https://doi.org/10.1088/0004-637X/808/2/190). <http://adsabs.harvard.edu/abs/2015ApJ...808..190R>

Proceedings

2014 **The Large Observatory for X-ray timing**, *Feroci, M.; den Herder, J. W.; Bozdoğan, E.; [...]; Penacchioni, A. V.; Perez, M. A. et al.*, Proceedings of the SPIE, Volume 9144, id. 91442T 20 pp., DOI: [10.1117/12.2055913](https://doi.org/10.1117/12.2055913). <http://adsabs.harvard.edu/abs/2014SPIE.9144E..2TF>

2015 **GRB 090510, Explosion of a GRB in the Highest Circumburst Medium Ever Inferred: a Disguised Short GRB**, *Muccino, M.; Ruffini, R.; Bianco, C. L.; Izzo, L.; Penacchioni, A. V.; Pisani, G. B.*, The Thirteenth Marcel Grossmann Meeting: On Recent Developments in Theoretical and Experimental General Relativity, Astrophysics and Relativistic Field Theories - Proceedings of the MG13 Meeting on General Relativity (in 3 Volumes). Edited by ROSQUIST KJELL ET AL. Published by World Scientific Publishing Co. Pte. Ltd., 2015. ISBN#9789814623995, pp. 1813-1816, DOI: [10.1142/9789814623995_0286](https://doi.org/10.1142/9789814623995_0286). <http://adsabs.harvard.edu/abs/2015mgm.conf.1813M>

2015 **On a Novel Distance Indicator for Gamma-Ray Bursts Associated with Supernovae**, *Pisani, G. B.; Izzo, L.; Ruffini, R.; Bianco, C. L.; Muccino, M.; Penacchioni, A. V.; Rueda, J. A.; Wang, Y.*, The Thirteenth Marcel Grossmann Meeting: On Recent Developments in Theoretical and Experimental General Relativity, Astrophysics and Relativistic Field Theories - Proceedings of the MG13 Meeting on General Relativity (in 3 Volumes). Edited by ROSQUIST KJELL ET AL. Published by World Scientific Publishing Co. Pte. Ltd., 2015. ISBN#9789814623995, pp. 1789-1793, DOI: [10.1142/9789814623995_0283](https://doi.org/10.1142/9789814623995_0283). <http://adsabs.harvard.edu/abs/2015mgm.conf.1789P>

2015 **GRB 111228, Analysis Within the Induced Gravitational Collapse Scenario and Association with a Supernova**, *Penacchioni, A. V.; Ruffini, R.; Bianco, C. L.; Izzo, L.; Muccino, M.; Pisani, G. B.*, The Thirteenth Marcel Grossmann Meeting: On Recent Developments in Theoretical and Experimental General Relativity, Astrophysics and Relativistic Field Theories - Proceedings of the MG13 Meeting on General Relativity (in 3 Volumes). Edited by ROSQUIST KJELL ET AL. Published by World Scientific Publishing Co. Pte. Ltd., 2015. ISBN#9789814623995, pp. 1781-1785, DOI: [10.1142/9789814623995_0281](https://doi.org/10.1142/9789814623995_0281). <http://adsabs.harvard.edu/abs/2015mgm.conf.1781P>

2015 **The Family of the Induced Gravitational Collapse Scenario: the Case of GRB 110709B**, *Penacchioni, A. V.; Ruffini, R.; Bianco, C. L.; Izzo, L.; Muccino, M.; Pisani, G. B.; Rueda, J. A.*, The Thirteenth Marcel Grossmann Meeting: On Recent Developments in Theoretical and Experimental General Relativity, Astrophysics and Relativistic Field Theories - Proceedings of the MG13 Meeting on General Relativity (in 3 Volumes). Edited by ROSQUIST KJELL ET AL. Published by World Scientific Publishing Co. Pte. Ltd., 2015. ISBN#9789814623995, pp. 1768-1772, DOI: [10.1142/9789814623995_0278](https://doi.org/10.1142/9789814623995_0278).
<http://adsabs.harvard.edu/abs/2015mgm..conf.1768P>

2015 **GRB 090227B: the Missing Link Between the Genuine Short and Long GRBs**, *Muccino, M.; Ruffini, R.; Bianco, C. L.; Izzo, L.; Penacchioni, A. V.; Pisani, G. B.*, The Thirteenth Marcel Grossmann Meeting: On Recent Developments in Theoretical and Experimental General Relativity, Astrophysics and Relativistic Field Theories - Proceedings of the MG13 Meeting on General Relativity (in 3 Volumes). Edited by ROSQUIST KJELL ET AL. Published by World Scientific Publishing Co. Pte. Ltd., 2015. ISBN#9789814623995, pp. 1757-1759, DOI: [10.1142/9789814623995_0275](https://doi.org/10.1142/9789814623995_0275).
<http://adsabs.harvard.edu/abs/2015mgm..conf.1757M>



Jonas Pedro Pereira

Curriculum Vitae

Brief description

Bachelor of Physics from Federal University of Itajubá, UNIFEI, Brazil, in 2010. Masters at the same institution from 2010 to 2011 on theoretical physics (nonlinear optics). Doctorate at the University of Rome, La Sapienza, on theoretical physics (relativistic astrophysics) from 2011 to 2014. Postdoctorate fellow at Towson University, USA, from 2015 to 2016 on metamaterials, analogue models and alternative theories to general relativity. Currently postdoctoral fellow at Federal University of ABC, Brazil, working on compact systems in astrophysics. Some areas of current interest: general relativity (thermodynamical, electrodynamical and stability aspects of astrophysical systems), nonlinear metamaterials (light properties in the limit of geometrical optics), analogue models to general relativity (optics), nonlinear electrodynamics and applications to general relativity, neutrino physics in general relativity, microphysical aspects of compact stars, stochastic variables for phenomenological quantum gravity, quantum field theory in curved spacetimes, alternative theories to general relativity (MOND), energy loss mechanisms in compact stars, neutron star asteroseismology (gravitational waves, stability, QPOs) and MHD (applied to magnetized compact stars).

Personal information

Place and date of birth Cachoeira de Minas, Minas Gerais, Brazil, 8 March 1987.

Nationality and gender Brazilian, Male.

Postdoctorate II

Period 2016–present.

Project *Some consequences of the microphysics of volumes and surfaces in compact systems.*

Collaborators Prof. Germán Lugones.

Institution Federal University of ABC, São Paulo, Brazil.

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Description Multidisciplinary postdoctoral project where some consequences (stability upon perturbations, glitches, QPOs, etc.) of new microphysical aspects of stratified compact stars will be investigated.

Grant FAPESP- Fundação de Amparo à Pesquisa do Estado de São Paulo.

Official English, Portuguese.

Language

Keywords General Relativity, Compact Stars, Equation of State, Surface degrees of freedom, QPOs, Glitches, Neutron Star Asteroseismology.

Postdoctorate I

Period 2015–2016.

Project *Metamaterials: a window for both technology and the cosmos*

Collaborators Profs. Vera N. Smolyaninova and Igor Smolyaninov.

Institution Towson University, Maryland, USA.

Description We envisage to probe under the theoretical and experimental points of view several aspects of general relativity by means of metamaterials, making use of the propagation of light rays in these media.

Grant CNPq-“Science without Borders” of the ministry of education of Brazil.

Official English

Language

Keywords Metamaterials, General Relativity.

PhD thesis

Period 2011–2014.

Title *General relativistic electrodynamical processes in neutron stars and black holes.*

Supervisors Prof. Remo Ruffini & Dr. Jorge A. Rueda.

Institution University of Rome, La Sapienza, Italy.

Description We investigated some of the consequences of endowing black holes and neutron stars also with an electrodynamical structure. Amongst other aspects, we are analyzed the thermodynamics of charged black holes, the stability of stratified stars having nontrivial surface degrees of freedom, the physics of neutrinos in the vicinities of charged systems and the properties related to the gluing of arbitrary rotating spacetimes (for models of neutron stars, for instance).

Grant Erasmus Mundus Joint Doctorate from EACEA of the European Commission, grant number 2011-1640.

Official English.

Language

Keywords General relativity, neutron stars, black holes, neutrino physics, surface degrees of freedom.

Master dissertation

Period 2010–2011.
Aver. grade 95/100.
Title *Trirefringence and one-way propagation of light in indefinite nonlinear metamaterials.*
Supervisor Prof. Vitorio Alberto De Lorenci.
Institution Federal University of Itajubá, UNIFEI, Brazil.
Description By studying light propagation in the limit of geometrical optics in nonlinear media where some of the components of their dielectric coefficients are negative, we showed that the optical effects of trirefringence and one-way propagation of light could always emerge from such systems.
Grant FAPEMIG- Fundação de Amparo à Pesquisa do Estado de Minas Gerais.
Official Portuguese.
Language
Keywords Electrodynamics, nonlinear media, geometric optics, indefinite metamaterials.

Bachelor of Physics

Period 2005–2010.
Aver. grade 90/100.
Essay *On the Newtonian dynamics in the regime of small accelerations.*
Supervisor Prof. Vitorio Alberto De Lorenci.
Institution Federal University of Itajubá, UNIFEI, Brazil.
Description We have studied in great detail a modification of Newton's second law, MOND. Besides, we have put forward a terrestrial laboratory based experiment that could act as a smoking gun for MOND and as a consequence also dark matter.
Official Portuguese.
Language
Keywords MOND, Spiral Galaxies, Newton's second law.

Undergraduate research projects

2009–2010 *Analogue cosmological models with nonlinear media.* Description: Research project done under the supervision of Prof. Vitorio Alberto De Lorenci. We have discussed the possibility of building analogue models for cosmology by making use of the propagation of disturbances in material media.
Grant CNPq-Conselho Nacional de Desenvolvimento Científico e Tecnológico.

2007–2007 *Investigations in theoretical physics- analogue models for general relativity and MOND*. Description: research project done under the supervision of Prof. Vitorio Alberto De Lorenci. We have studied the bases of general relativity and the construction of analogue models for general relativity in material media by making use of the method of the field disturbances, or the Hadarmard-Papapetrou method. We have also investigated an alternative proposal to dark matter, called MOND, as well as some ways of testing it.

Grant FAPEMIG-Fundação de Amparo à Pesquisa do Estado de Minas Gerais.

Computer skills

Advanced \LaTeX , Mathematica, Microsoft Windows.
Intermediate OpenOffice, Linux, Maple, C++.
Basic Fortran.

Languages

Portuguese Native speaker.
English Listening (very good), speaking (very good), reading (very good), writing (very good).
Italian Listening (very good), speaking (very good), reading (very good), writing (very good).
Spanish Listening (very good), speaking (very good), reading (very good), writing (very good).
French Listening (very good), speaking (very good), reading (very good), writing (very good).
Mandarin Listening (basic), speaking (basic), reading (poor), writing (poor).

Published works

- 1 De Lorenci, V. A., Faúndez-Abans, M. , Pereira, J. P.; *Testing The Newton Second Law in the Regime of Small Accelerations*, Astron. Astrophys. 503, L1 (2009).
- 2 De Lorenci, Vitorio A., Pereira, Jonas P.; *Tiirefringence in nonlinear metamaterials*, Phys. Rev. A 86, 013801 (2012).
- 3 De Lorenci, Vitorio A., Klippert, R., Pereira, Jonas P., Shi-Yuan, Li; *Multirefringence phenomena in nonlinear electrodynamics*, Phys. Rev. D 88, 065015 (2013).
- 4 De Lorenci, Vitorio A., Pereira, Jonas P.; *One way propagation of light in Born-Infeld-like metamaterials*, Phys. Rev. A 89, 043822 (2014).
- 5 Pereira, Jonas P., Mosquera Cuesta, Herman J., Rueda, Jorge A., Ruffini, R.; *On the black hole mass decomposition in nonlinear electrodynamics*, Phys. Lett. B 734, 396 (2014).
- 6 Pereira, Jonas P., Rueda, Jorge A., Coelho, Jaziel G.; *Stability of thin-shell interfaces inside compact stars*, Phys. Rev. D. 90, 123011 (2014).
- 7 Pereira, Jonas P., Rueda, Jorge A.; *Radial stability in stratified stars*, Astrophys. J. 801, 19 (2015).

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- 8 Pereira, Jonas P., Rueda, Jorge A.; *Energy decomposition within Einstein-Born-Infeld black holes*, Phys. Rev. D. 91, 064048 (2015).
- 9 Coelho, Jaziel G., Pereira, Jonas P., de Araújo, José C.N.; *The influence of quantum vacuum friction on pulsars*, Astrophys. J. 823, 97 (2016).
- 10 Bittencourt, Eduardo, Pereira, Jonas P., Smolyaninov, Igor I., Smolyaninova, Vera N.; *The flexibility of optical metrics*, Class. Quantum Grav. 33, 165008 (2016).
- 11 Pereira, Jonas P., Overduin, James M., Poyneer, Alexander J.; *Satellite test of the equivalence principle as a probe of modified newtonian dynamics*, Phys. Rev. Lett. 117, 071103 (2016).
- 12 Pereira, Jonas P., Smolyaninov, Igor I., Smolyaninova, Vera N.; *Magnetic liquids under high electric fields as broadband optical diodes*, Phys. Rev. A. 94, 043852 (2016).
- 13 Mosquera Cuesta, Herman J., Lambiase, Gaetano, Pereira, Jonas P.; *Probing non-linear electrodynamics in slowly rotating spacetimes through neutrino astrophysics*, Phys. Rev. D. 95, 025011 (2017).
- 14 Pereira, Jonas P.; *STEP as a decisive test of MOND on Earth*, Int. J. Mod. Phys. Conf. Ser. 45, 1760013 (2017).

International events

- Sep. 2010 XIV Brazilian School of Cosmology and Gravitation. Congress. Description: Participation. It took place in Mangaratiba, Brazil, on Gravitation and Cosmology.
- July 2012 XIII Marcel Grossman Congress. Description: Participation. It took place in Stockholm, Sweden, on General Relativity.
- Dec. 2013 27th Texas Symposium. Description: Talk given: *Black hole mass decomposition in nonlinear electrodynamics and applications*. It took place in Texas, USA, on Relativistic Astrophysics.
- Mar. 2014 Zel'dovich- 100 Meeting. Description: Talk given: *Black hole mass decomposition in nonlinear electrodynamics and some of its consequences*. It took place in Minsk, Belarus, in honor of the 100th anniversary of Yakov Borisovich Zel'dovich.
- Jul. 2014 Black Holes: the largest energy sources in the universe. Description: Talk given: *Black hole mass decomposition in nonlinear electrodynamics and some of its consequences*. It took place in Yerevan, Armenia, on the occasion of the 1st Scientific ICRANet Meeting in Armenia.
- Apr. 2015 2nd César Lattes Meeting "Supernovae, Neutron Stars, Black Holes". Talk given: *Radial Stability in Stratified Stars*. It took place in Niteroi, Brazil, celebrating the golden jubilee of Einstein's general theory of relativity.
- Oct. 2016 7th IWARA. Talk given: *STEP as a decisive test of MOND on Earth*. It took place in Gramado, Brazil, on issues regarding Relativistic Astrophysics.
- Dec. 2017 29th Texas Symposium on Relativistic Astrophysics. Talk to be given: *Phase transition effects on the dynamical stability of hybrid neutron stars*. It will take place in Cape Town, South Africa.

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Contact references

- 1 Vitorio Alberto De Lorenci. Masters supervisor. Email: delorenci@unifei.edu.br
- 2 Remo Ruffini. PhD advisor. Email: ruffini@icra.it
- 3 Jorge A. Rueda. PhD co-advisor. Email: jorge.rueda@icra.it
- 4 Vera N. Smolyaninova. Postdoctoral collaborator. Email: vsmolyaninova@towson.edu
- 5 Igor Smolyaninov. Postdoctoral collaborator. Email: smoly@umd.edu
- 6 James M. Overduin. Postdoctoral collaborator. Email: joverduin@towson.edu
- 7 Germán Lugones. Postdoctoral collaborator. Email: german.lugones@ufabc.edu.br

Awards

- 1 One of the nine selected candidates (in the world) for an European PhD grant in physics within the celebrated Erasmus Mundus program.

Pisani Giovanni Battista

Position: Post-Doc Researcher at Sapienza University of Rome, Rome, Italy and ICRANet, Pescara, Italy

Period covered: 1st April 2015 – Today



I Scientific Work

Gamma Ray Bursts (GRBs) are among the most puzzling astronomical objects since their first detection by the Vela satellites in the late 1960s. GRBs are flashes in gamma-rays observed in distant galaxies. They can last from milliseconds to several minutes with an isotropic energy released up to the order of one solar mass. This peculiarity makes them the most powerful events ever observed in the Universe. A variety of models have been developed to theoretically explain the observational properties of GRBs.

My PhD research project includes the reduction and analysis of GRBs data from different satellites, such as Batse, Swift or Fermi. I investigate GRBs observations within the fireshell model scenario, which predicts that GRBs originate from an optically thick e^+e^- plasma at thermal equilibrium created by vacuum polarization during the formation of a Black Hole.

My attention is focused on GRBs associated with Supernovae (SN). Since the first discovery of this association (GRB 980425 - SN1998wt), various mechanisms have been proposed to explain it. Recently Prof. Ruffini and his collaborators have proposed the Induced Gravitational Collapse (IGC) occurring in a particular class of binary systems as progenitors for the GRB-SN sources having a released isotropic energy above 10^{52} ergs. We refer to such phenomena as Binary-driven HyperNovae (BdHNe). Together with them we are further developing the BdHN paradigm and enlarging the sample of BdHN candidates. One of the most exciting outcomes of this work is the possibility to consider this class of BdHN events as a standard candle. If confirmed, this result could provide new independent challenges on the current cosmological model back to 600 millions years only after the Big Bang.

During my current Post-Doc research project, basing on my Ph.D. thesis results, I am focusing on building a complete sample of BdHNe looking at redshifts larger than $z \sim 1$, in order to drastically enlarge our current sample and to confirm that the standard candle hypothesis holds at larger cosmological distances. My recent analysis on a complete sample of 161 BdHNe, observed by the Swift satellite up to the end of 2015, points to a non-spherical emission of the late X-ray of BdHNe which is supposedly generated by the young SN remnant. This result is in agreement with the observations of non-spherical SN remnants.

II Conferences and educational activities

II a Conferences and Other External Scientific Work

- 1) “Erasmus Mundus School”, Nice, France, 5th - 17th September, 2011;
- 2) “IRAP Erasmus Mundus Workshop”, Les Houches, France, 2nd - 6th October, 2011;
- 3) “Third Galileo-Xu Guangqi” meeting, Beijing, China, 11th- 15th October, 2011;
- 4) “Fermi/Swift GRB 2012 Conference”, Munich, Germany, 7th – 11th May, 2012;
- 5) “Erasmus Mundus School”, Nice, France, 4th – 8th June, 2012;
- 6) “13th Marcel Grossmann Meeting”, Stockholm, Sweden, 1st - 7th July, 2012;
- 7) “Erasmus Mundus School”, Nice, France, 3rd – 19th September, 2012;
- 8) III National Congress “Lampi su Napoli”, Naples, Italy, 20th - 22nd September, 2012;
- 9) “The Current Issues on Relativistic Astrophysics”, 5th - 6th October, 2012, Seoul, South Korea;
- 10) “7th Huntsville GRB Symposium”, Nashville TN, USA, 14th – 18th April, 2013;
- 11) “2nd Bego Rencontres”, Nice, France, 16th – 31st May, 2013;
- 12) “2013 yearly ICRANet Scientific Meeting on Relativistic Astrophysics”, Pescara, Italy, 3rd – 21th June, 2013;
- 13) “1st URCA Meeting on Relativistic Astrophysics”, Rio de Janeiro, Brasil, 24th – 29th June, 2013;
- 14) “13th Italian-Korean Symposium on Relativistic Astrophysics”, Seoul, South Korea, 15th – 19th July, 2013;
- 15) “Erasmus Mundus School”, Nice, France, 3rd – 20th September, 2013;
- 16) “27th Texas Meeting on Relativistic Astrophysics”, Dallas TX, USA, 8th - 13th, December 2013;
- 17) “Erasmus Mundus School”, Nice, France, 23rd - 27th February, 2014;
- 18) “Erasmus Mundus School”, Les Houches, France, 11th - 16th May, 2014;
- 19) “1st Scientific ICRANet Meeting in Armenia”, Yerevan, Armenia, 30th June - 4th July, 2014.
- 20) “3rd Bego Rencontres”, Nice, France, 8th – 19th September, 2014;
- 21) “Swift: 10 Years of Discovery”, Rome, Italy, 2nd – 5th December, 2015;
- 22) “2nd Cesar Lattes Meeting”, Rio de Janeiro, Brazil, 10th – 20th April, 2015;
- 23) “The XIV Marcel Grossmann Meeting”, Rome, Italy, 13th – 17th July, 2015;
- 24) “The 14th Italian-Korean Symposium on Relativistic Astrophysics”, Pescara, Italy, 20th – 24th July, 2015;
- 25) “4th Bego Rencontres”, Nice, France, 30th May – 3rd June, 2016;
- 26) “Supernovae, Hypernovae, and Binary-driven HyperNovae: an Adriatic Workshop”, Pescara, Italy, 20th – 27th June, 2016;

II b Work With Students

Co-tutoring of Erasmus Mundus Ph.D. Students: Milos Kovacevic and Daria Primorac.

II c Diploma thesis supervision

II d Other Teaching Duties

II e. Work With Postdocs

III. Service activities [*activities carried out in collaboration with ICRANet (e.g. teaching activities, conferences etc...) and outside ICRANet (teaching activities in your university etc...)*]

III a. Within ICRANet

Teaching activities for international Ph.D. Schools organized by ICRANet. List of schools and lectures:

1) “Erasmus Mundus School”, Nice, France, 4th – 8th June, 2012;

Lecture: A new interpretation for the disguised short GRB 060614; G. B. Pisani, R. Ruffini, C.L. Bianco, L. Izzo, J. A. Rueda, M. Muccino, A. V. Penacchioni.

2) “Erasmus Mundus School”, Nice, France, 3rd – 19th September, 2012;

Lecture: The class of “disguised” short GRBs within the fireshell model and the particular case of GRB 060614; G. B. Pisani, R. Ruffini, C.L. Bianco, L. Izzo, M. Muccino, A. V. Penacchioni;

3) “2nd Bego Rencontres”, Nice, France, 16th – 31st May, 2013;

Lecture: A new subclass of energetic GRB-SN sources: The IGC GRB-SN family; G. B. Pisani, R. Ruffini, C.L. Bianco, L. Izzo, M. Muccino, A. V. Penacchioni, J. A. Rueda.

4) “Erasmus Mundus School”, Nice, France, 3rd – 20th September, 2013;

Lecture: A new subclass of energetic GRB-SN sources: The IGC GRB-SN family; G. B. Pisani, R. Ruffini, C.L. Bianco, L. Izzo, M. Muccino, A. V. Penacchioni, J. A. Rueda.

5) “Erasmus Mundus School”, Nice, France, 23rd - 27th February, 2014;

Lecture 1: GRBs-SNe within the Induced Gravitational Collapse model; G. B. Pisani, R. Ruffini, C.L. Bianco, M. Enderli, L. Izzo, M. Kovacevic, M. Muccino, A. V. Penacchioni, J. A. Rueda, Y. Wang;

Lecture 2: The role of the High Energy in short and long GRBs; G. B. Pisani, R. Ruffini, C.L. Bianco, M. Enderli, L. Izzo, M. Kovacevic, M. Muccino, A. V. Penacchioni, J. A. Rueda, Y. Wang.

6) “Erasmus Mundus School”, Les Houches, France, 11th - 16th May, 2014;

Lecture: GRBs-SNe within the Induced Gravitational Collapse model: towards a new standard candle; G. B. Pisani, R. Ruffini, C.L. Bianco, M. Enderli, L. Izzo, M. Kovacevic, M. Muccino, A. V. Penacchioni, J. A. Rueda, Y. Wang.

7) “3rd Bego Rencontres”, Nice, France, 8th – 19th September, 2014;

Lecture: Energetic GRBs-SNe within the Induced Gravitational Collapse; G. B. Pisani, R. Ruffini, C.L. Bianco, M. Enderli, L. Izzo, M. Kovacevic, M. Muccino, A. V. Penacchioni, J. A. Rueda, Y. Wang;

8) “4th Bego Rencontres”, Nice, France, 30th May – 3rd June, 2016;

Lecture: Properties of the X-ray afterglow of Binary-driven HyperNovae; G. B. Pisani, R. Ruffini, Y. Aimuratov, C.L. Bianco, M. Enderli, L. Izzo, M. Kovacevic, M. Muccino, A. V. Penacchioni, J. A. Rueda, Y. Wang.

III b. Outside ICRANet

- Academic Year 2015/2016:

Teaching activity as assistant of Professor Valerio Parisi in his “Medical Physics” classes for Medical Science students, Sapienza University of Rome;

- Academic Year 2016/2017:

Teaching activity as assistant of Professor Valerio Parisi in his “Medical Physics” classes for Medical Science students, Sapienza University of Rome;

- Academic Year 2017/2018:

Teaching activity as assistant of Doctor Stefano Sarti in his “Physics II” classes for Environmental and Geomatic Engineering students, Sapienza University of Rome.

IV. Other

2017 List of Publication

- Ruffini R., Rodriguez J., Muccino M., Rueda J.A, Aimuratov Y., Barres de Almeida U., Becerra L.M., Bianco C.L., Cherubini C., Filippi S., Gizzi D., Kovacevic M., Moradi R., Oliveira F.G., Pisani G.B., Wang Y., “On the rate and on the gravitational wave emission of short and long GRBs”, submitted to Astrophysical Journal, arXiv:1602.03545
- Ruffini, R.; Aimuratov, Y.; Becerra, L.; Bianco, C. L.; Karlica, M.; Kovacevic, M.; Melon Fuksman, J. D.; Moradi, R.; Muccino, M.; Penacchioni, A. V.; Pisani, G. B.; Primorac, D.; Rueda, J. A.; Shakeri, S.; Vereshchagin, G. V.; Wang, Y.; Xue, S.-S., “The cosmic matrix in the 50th anniversary of relativistic astrophysics”, 2017, International Journal of Modern Physics D, 26, 1730019-367
- Rueda, Jorge A.; Aimuratov, Y.; de Almeida, U. Barres; Becerra, L.; Bianco, C. L.; Cherubini, C.; Filippi, S.; Karlica, M.; Kovacevic, M.; Fuksman, J. D. Melon; Moradi, R.; Muccino, M.; Penacchioni, A. V.; Pisani, G. B.; Primorac, D.; Ruffini, R.; Sahakyan, N.; Shakeri, S.; Wang, Y., “The binary systems associated with short and long gamma-ray bursts and their detectability”, 2017, International Journal of Modern Physics D, 26, 1730016-309
- Aimuratov, Y.; Ruffini, R.; Muccino, M.; Bianco, C. L.; Penacchioni, A. V.; Pisani, G. B.; Primorac, D.; Rueda, J. A.; Wang, Y., “GRB 081024B and GRB 140402A: Two Additional Short GRBs from Binary Neutron Star Mergers”, 2017, Astrophysical Journal, 844, 83

- Luongo O., Pisani G.B., Troisi A., “Cosmological degeneracy versus cosmography: a cosmographic dark energy model”, 2017, International Journal of modern physics D, 26, 1750015

Sawant Disha

Position: Research Associate, PRL, Ahmedabad, India
Period covered: 6 months



I Scientific Work

1. Worked under Prof. Alak Ray in the Department of Astronomy and Astrophysics, Tata Institute of Fundamental Research (TIFR), Mumbai during Visiting Students' Research Program (VSRP 2010) on the topic of “Supernova 2009bb: Optical Analysis”.
2. Worked under Prof. Prasad Subramanian as a project student in Indian Institute of Scientific Education and Research (IISER), Pune on the topic of “Type- I Solar Radio Bursts”.
3. During my PhD, under fully funded fellowship of International Relativistic Astrophysics Program (IRAP), in order to apply GRBs for cosmology, we studied the possibility to extract model independent information about the dynamics of the universe by using a cosmographic approach considering only minimal assumptions (isotropy, homogeneity, Taylor series expansion of distances) without choosing any dynamical model as priori.

In order to explore it systematically, we performed a high redshift analysis that allowed us to put constraints on the cosmographic expansion up to the fifth order, based on the Union2 Type Ia Supernovae (SNIa) data set.

The Hubble diagram was constructed from some Gamma Ray Bursts luminosity distance indicators, and Gaussian priors on the distance from the Baryon Acoustic Oscillations (BAO), and the Hubble constant H_0 . Actually we used two GRB data sets, one sample consisted of 109 high redshift GRBs and has been constructed from the Amati $E_{p,i} - E_{iso}$ correlation. The second GRBs sample is constructed from 66 Gamma Ray Bursts (GRBs) derived using only data from their X- ray afterglow light curve.

4. I worked on Gamma Ray bursts' datasets (Beppo SAX, Fermi, Swift, BATSE, Konus- Wind) to refine time averaged values of peak energies and luminosities by taking into account uncertainties on spectral parameters and fluences.

Also, in order to understand the selection effects and instrumental impact of different GRB missions on the standardization of GRBs, I performed comparative analysis of different GRB spectral components on the Amati $E_{p,i} - E_{iso}$ correlation.

5. Currently I am working on NASA's MAVEN data from IUVS instrument. I am trying to understand the metallic ions' presence and their evolution in Martian ionosphere from UV profiles.

II Conferences and educational activities

II a Conferences and Other External Scientific Work

1. 2 weeks “Winter School in Astronomy and Astrophysics” conducted by TIFR. December 2009
2. “Winter School on High Energy Astrophysics”, a school on High Energy Astrophysics with special emphasis on accretion onto compact objects held at the Harish- Chandra Research Institute (HRI). 6-18 February 2012
3. Erasmus Mundus Astrophysics school on in Nice, France. 3-19 September 2012
4. “Huntsville Gamma Ray Burst Symposium” in Nashville, Tennessee, USA. 14-18 April 2013
5. “The 2013 yearly ICRANet Scientific Meeting on Relativistic Astrophysics” in Pescara, Italy. 3-21 June 2013
6. Erasmus Mundus Astrophysics school in Nice, France. 15 May-1 June 2013
7. Erasmus Mundus Astrophysics school in Nice, France. 2-16 September 2013
8. “The 1st Scientific ICRANet Meeting in Yerevan, Armenia on Black Holes: the largest energy sources in the Universe”. 30 June- 4 July 2014
9. Erasmus Mundus Astrophysics school in Les Houches, France. 10-16 May 2014
10. Erasmus Mundus Astrophysics school in Nice, France. 8-19 September 2014
11. “SWIFT 10 years of discovery” meeting on SWIFT satellite mission in Rome Sapienza University, Rome, Italy. 1-3 December 2014
12. “PLANCK 2014- The microwave sky in temperature and polarization”
meeting on Planck satellite mission in Ferrara, Italy. 4-5 December 2014

III. Service activities

III b. OutsideICRANet

1. 1 year certificate course of “Basic Astronomy and Astrophysics” conducted by Mumbai University at Nehru Planetarium in 2008.
2. 1 year certificate course of “Advanced Astronomy and Astrophysics”
conducted by Mumbai University at Nehru Planetarium in 2010.
3. University course for Italian Language
4. Mathematical Physics Course
5. Radiative processes in Astrophysics
6. X-Ray and Gamma Ray Astronomy Techniques

IV. Other

Conference publications:

1. PRIN Meeting on Gamma Ray Bursts in Ferrara university, 10 April 2014
2. “Swift: 10 Years of Discovery” international meeting in La Sapienza University, Rome, Italy, 2-5 December 2014
3. 2nd César Lattes Meeting in Niterói, Rio De Janeiro, April 13-18, 2015
4. 14th Marcel Grossmann Meeting in Rome, July 12-18, 2015

Presentations:

1. University of Nice meeting on relativistic astrophysics in June 2013 on the introduction to thesis topic
2. University of Nice meeting on relativistic astrophysics in September 2013 on work updates on thesis
3. Prin meeting on 10th April 2014 on “investigation of Amati correlation in terms of selection and instrumental parameters” held in University of Ferrara
4. Les Houches astrophysical meeting May 2014 on progress report of thesis
5. University of Nice meeting on relativistic jets and black-holes in September 2014 on work updates on thesis
6. University of Ferrara PRIN meeting on 7th October 2014 on work progress in the group meeting

Posters:

1. “Standardizing GRBs for Cosmological purposes” in Huntsville Gamma Ray Burst Symposium GRB 2013 in Nashville, Tennessee, USA. 14-18 April 2013
2. “GRB correlation(s) for cosmology” in “Swift: 10 Years of Discovery” international meeting
3. “Variations in GRB correlations: based on observable quantities” in La Sapienza University, Rome, Italy, 2-5 December 2014
4. “Metallic ion chemistry in the ionosphere of Mars: Comparison with MAVEN observation” in Symposium on Vision & Explorations for Planetary Sciences in Decades 2020-2060 Brainstorming Session (8-10 November, 2017) in PRL Ahmedabad, India, 8-10 November 2017

2017 List of Publication

1. MarekDemianski, DishaSawant, Ester Piedipalumbo, Lorenzo Amati:

Cosmology with gamma-ray bursts. I. The Hubble diagram through the calibrated $E_{p,i}$ -Eiso correlation, *Astronomy & Astrophysics*, 10.1051/0004-6361/201628909 [A&A 598, A112 (2017)]

2. MarekDemianski, DishaSawant, Ester Piedipalumbo, Lorenzo Amati:

Cosmology with gamma-ray bursts. II. Cosmography challenges and cosmological scenarios for the accelerated Universe, *Astronomy & Astrophysics*, 10.1051/0004-6361/201628911 [A&A 598, A113 (2017)]

3. DishaSawant, Lorenzo Amati: Variations in GRB observables' correlation and their impact on Cosmological computations (in preparation)

4. DishaSawant, Lorenzo Amati: Time resolved $E_{p,i}$ - Luminosity correlation in Fermi /GBM GRBs: update and implications(in preparation)

Sridhar Srivatsan

Position: PhD student

Period covered: November 2013 – November 2016



I Scientific Work

Statistical analysis of galaxy cluster distribution and cosmological constraints from the Euclid Wide Survey

II Conferences and educational activities

II a Conferences and Other External Scientific Work

Title	Period	Duration
Erasmus Mundus school, Nice, France	Feb 23 rd to March 2 nd , 2014	1 week (Participant)
Euclid Consortium Meeting, Marseille, France	May 5 th to May 9 th , 2014	1 week (Participant)
Erasmus Mundus school, Les Houches, France	May 11 th to May 15 th , 2014	1 week (Participant)
Euclid OU-LE3 meeting, Paris, France	June 22 nd to June 27 th , 2014	1 week (Participant)
Cluster cosmology in the XXI century, Madrid, Spain	November 3 rd to November 8 th , 2014	1 week (Participant)
JDPN, Barcelonnette	March 23 rd to March 27 th , 2015	1 week (Presented work)
Euclid joint SWG-OULE3 Galaxy Clusters meeting, Bologna	May 5 th to May 8 th , 2015	1 week (Presented work)

II b Work With Students

None

II c Diploma thesis supervision

None

II d Other Teaching Duties

None

II e. Work With Postdocs

None

III. Service activities *[activities carried out in collaboration with ICRANet (e.g. teaching activities, conferences etc...) and outside ICRANet (teaching activities in your university etc...)]*

III a. Within ICRANet

III b. Outside ICRANet

Was a full time volunteer at the Euclid OU-LE3 meeting held in Paris on the month of June 2014.

IV. Other

List of Publication

- 1) “Evolution of the real-space correlation function from next generation cluster surveys”,
Srivatsan Sridhar, et al., 2016.

arXiv link: www.arxiv.org/abs/1612.02821v2

DOI: www.dx.doi.org/10.1051/0004-6361/201629369

- 2) “Galaxy and Mass Assembly (GAMA): Projected Galaxy Clustering”.

Full refereed journal article: www.mnras.oxfordjournals.org/content/454/2/2120.full.pdf

arXiv link: www.arxiv.org/pdf/1509.02159v1.pdf

- 3) “Statistical analysis of the galaxy cluster distribution from next generation cluster surveys”.

<http://www.researchgate.net/publication/311799900> Statistical analysis of the galaxy cluster distribution from next generation cluster surveys

- 4) “Galaxy clustering, it's dependence on galaxy properties”.

<http://www.researchgate.net/publication/271847706> Galaxy clustering it's dependence on galaxy properties

Stahl Clément



Position: Erasmus Mundus PhD student

Period covered: 2013-present

I Scientific Work

On early and late phases of acceleration of the expansion of the Universe

II Conferences and educational activities

II a Conferences and Other External Scientific Work

- 1) 25 May 2016: Crafoord Prize Symposium: Rotating black holes and their astrophysical consequences, Stockholm
- 2) April-May 2016: 4th Bego rencontres, IRAP Ph.D. Erasmus Mundus school, Nice
- 3) June 2016: Supernovae, Hypernovae and Binary Driven Hypernovae, An Adriatic Workshop, Pescara

II b Work With Students

II c Diploma thesis supervision

II d Other Teaching Duties

II e. Work With Postdocs

III. Service activities

III a. Within ICRANet

III b. Outside ICRANet

IV. Other

V.2016 list of Publication :

C. Stahl, Inhomogeneous matter distribution and supernovae, Int. J. Mod. Phys. D **25**, 1650066, <http://www.worldscientific.com/doi/abs/10.1142/S0218271816500668> .

- C. Stahl, E. Strobel, S-S. Xue, Fermionic current and Schwinger effect in de Sitter spacetime, Phys. Rev. D **93** (2016) 2, 025004, <http://arxiv.org/abs/1507.01686>
- C. Stahl, S-S. Xue, Schwinger effect, backreaction and magnetogenesis in de Sitter spacetime, Phys.Lett. B **760** (2016) 288-292, <https://arxiv.org/abs/1603.07166>
- C. Stahl, E. Strobel, S-S. Xue, Pair creation in the early universe, <http://arxiv.org/abs/1602.09090> (proceeding of MG14)
- E. Bavarsad, C. Stahl S.-S. Xue, Scalar current of created pairs by Schwinger mechanism in de Sitter spacetime, <http://arxiv.org/abs/1602.06556> , accepted to PRD

Strobel Eckhard

Position: PhD Student

Period covered: September 1, 2012-August 31, 2015



I Scientific Work

Critical and overcritical Electromagnetic Fields

II Conferences and educational activities

II a Conferences and Other External Scientific Work

- April 2015 “Second CÉSAR LATTES Meeting”, Rio de Janeiro, Brazil
- July 2015 “Fourteenth Marcel Grossmann Meeting – MG14”, Rome, Italy
- July 2015 “Conference on Extremely High Intensity Laser Physics”

II b Work With Students

II c Diploma thesis supervision

II d Other Teaching Duties

II e. Work With Postdocs

III. Service activities *[activities carried out in collaboration with ICRANet (e.g. teaching activities, conferences etc...) and outside ICRANet (teaching activities in your university etc...)]*

III a. Within ICRANet

III b. Outside ICRANet

IV. Other

2014 List of Publication

Borja, Enrique F., Iñaki Garay, and Eckhard Strobel. "The Quantum Scalar Field in Spherically Symmetric Loop Quantum Gravity." *Progress in Mathematical Relativity, Gravitation and Cosmology*. Springer Berlin Heidelberg, 2014. 153-156.

Eckhard Strobel, and She-Sheng Xue. "Semiclassical pair production rate for time-dependent electrical fields with more than one component: -WKB-approach and world-line instantons" *Nuclear Physics B* 886 (2014): 1153.

Strobel, Eckhard, and She-Sheng Xue. "Semiclassical pair production rate for rotating electric fields." *Physical Review D* 91.4 (2015): 045016.

Hagen Kleinert, Eckhard Strobel and She-Sheng Xue. "Fractional Effective Action at Strong Electromagnetic Fields." *Nonlinear Phenomena in Complex Systems* 17.4 (2015): 377-380.

Valsan Vineeth



Position: Erasmus Mundus PhD, University of Ferrara

Period covered: From September 2010

I Scientific Work

Extending the band of focusing X-ray telescopes beyond 100 keV: motivations and proposed solutions

Developing focusing telescopes for hard X-/soft gamma-rays (70-600 keV) based on Laue lenses, including the study of possible payload configurations for future broad band X-ray missions. The thesis will also deal on science objectives that can be solved with this new instrumentation.

II Conferences and educational activities

II a Conferences and Other External Scientific Work

Schools and Workshops:

1. Erasmus mundus School, Nice, France: 6-30 Setpember 2010.
2. Erasmus Mundus Workshop, Les Houches, France: 3rd- 8th April, 2011.
3. Erasmus Mundus School, Nice, France: 22 May - 11 June, 2011
4. Erasmus Mundus School, Nice, France: 5th - 16th September, 2011.
5. Erasmus Mundus School, Nice, France: 3rd – 21st September, 2012.

Conferences and Seminars:

1. Visit to the ICRANet center in Pescara: 1-13 October, 2010.
2. "IRAP Ph.D. Erasmus Mundus Workshop", March 21th-26th, 2011, Pescara (Italy);
3. 25th Symposium of Relativistic Astrophysics "Texas 2010", Heidelberg, Germany: December 6th-10th, 2010.
4. SPIE Optics and Photonics Conference, San Diego, California USA: 19 - 23 Aug, 2011
5. "Second Ferrara Workshop on X-Ray astrophysics up to 511keV", Ferrara, Italy: 14th-16th September, 2011.
6. "RJR-70" Meeting, University of La Sapienza, Rome, Italy: 5 - 7 June, 2012

7. SPIE Astronomical Instrumentation and Telescopes Conference, Amsterdam, Netherlands:
1 - 6 July, 2012
8. "Marcel Grossmann" meeting, Stockholm, Sweden:
1st - 7th July, 2012.

Publications:

- 1."The LAUE project for broadband gamma-ray focusing lenses", E. Virgilli, F. Frontera, V. Valsan, V. Liccardo. (Proc. SPIE 8147, 81471C (2011); doi:10.1117/12.895236);
- 2."Laue lenses for hard x-/soft gamma-rays: new prototype results", E. Virgilli, F. Frontera, V. Valsan, V. Liccardo. (Proc. SPIE 8147, 81471B (2011); doi:10.1117/12.895233);
3. "Gamma-ray Laue lenses under development for deep AGN observations", F. Frontera, G. Risaliti, E. Virgilli, V. Liccardo, V. Valsan. (Journal of Physics: Conference Series 355 (2012) 012005; doi:10.1088/1742-6596/355/1/012005);
4. "Characterization of bent crystals for Laue lenses", V. Liccardo, F. Frontera, E. Virgilli, V. Valsan. Proc. SPIE 8443, (2012);
- 5."Development status of LAUE project", F. Frontera, V. Liccardo, E. Virgilli, V. Valsan, V. Carassiti, S. Chiozzi, F. Evangelisti, S. Squerzanti, M. Statera Proc. SPIE 8443, (2012);
- 6."Expected performance of a Laue lens based on bent crystals", V. Valsan, E. Virgilli, V. Liccardo, F. Frontera. Proc. SPIE 8443, (2012)

Presentations and Poster:

1. "Laue lenses for hard X-/soft gamma-rays: new prototype results", SPIE Optics and Photonics conference, San Diego, USA. August 2011.
2. "Test results of a new Laue lens prototype for soft gamma-rays", Second Ferrara workshop on X-ray Astrophysics upto 511 keV, Ferrara, Italy. September 2011.
3. "Expected performance of a Laue lens based on bent crystals", SPIE Astronomical telescopes and Instrumentation conference, Amsterdam. July 2012.
4. "Laue lenses for hard X-/soft gamma rays: From retrospective modeling to prospective performance.", Erasmus Mundus School, Nice, France, September 2012.

Courses, activity and certificates:

- “Techniques of analysing temporal datas”, Prof. Mauro Orlandini
(40 hours course)
- “Observation techniques of astrophysical X-rays and Gamma rays”, Prof. Filippo Frontera
(40 hours course)
- “Spectrum energy correlations in GRBs”, Prof. Lorenzo Amati
(40 hours course)
- “ Detectors for high energy astrophysics”, Prof. Ezio Carol
(40 hours course)
- “Computational analysis of crystal diffraction”,
Manuel Sanchez Del Rio, Engineer, Instrumentation Services and Development Division European
Synchrotron Radiation Facility (ESRF), Grenoble.
- First certificate in Italian language.

Wu Yuanbin

Position: PhD student
Period covered: 2011-2014



I Scientific Work

Work in collaboration with ICRANet:

- Surface properties of the core-crust interface of neutron stars with global charge neutrality. The strong, weak, electromagnetic, and gravitational interactions are included in this neutron star model.
- Surface properties of giant-nucleus compressed atoms.
- The Einstein-Euler-Heisenberg (EEH) theory and charged black holes in the EEH theory. In the EEH theory, the one-loop nonperturbative QED effects of strong fields described by the Euler-Heisenberg effective Lagrangian is involved.
- Generalized Breit-Wheeler process of electron-positron pair production in the collision of a probe photon with two plane waves.

II Conferences and educational activities

II a Conferences and Other External Scientific Work

Conferences and schools attended during my PhD study:

- (1) Erasmus Mundus IRAP PhD school, Nice, France, September 2011
- (2) IRAP PhD Erasmus Mundus Workshop "Gamma Ray Bursts, their progenitors and the role of thermal emission", Les Houches, France, October 2011
- (3) Third Galileo - Xu Guangqi meeting, Beijing, China, October 2011
- (4) SIGRAV Graduate School -X Edition- "Astrophysical Black Holes", Como, Italy, May 2012
- (5) Erasmus Mundus IRAP PhD school, Nice, France, June 2012
- (6) 13th Marcel Grossmann Meeting, Stockholm, Sweden, July 2012
- (7) Erasmus Mundus IRAP PhD school, Nice, France, September 2012
Talk: Surface tension of neutron star matter
- (8) 2nd Bego Rencontres, Nice, France, May 2013
Talk: On the surface tension of neutron star matter
- (9) The 2013 yearly ICRANet Scientific Meeting on Relativistic Astrophysics, ICRANet, Pescara, Italy, June 2013
- (10) The 13th Italian-Korean Symposium on Relativistic Astrophysics, Seoul, Korea, July 2013.

- Talk: On the surface tension and Coulomb energy of neutron star matter
- (11) Erasmus Mundus IRAP PhD school, Nice, France, September 2013.
Talk: Einstein-Euler-Heisenberg theory and charged black holes
- (12) Erasmus Mundus IRAP PhD school, Nice, France, February 2014.
Talk: Strong electromagnetic fields in neutron stars, black holes, and laboratory experiments
- (13) Workshop "Supernovae, Gamma-ray bursts and the induced gravitational collapse", Les Houches, France, May 2014
Talk: Nonrotating Charged Black Holes in Einstein-Euler-Heisenberg Theory
- (14) 1st Scientific ICRANet Meeting in Armenia - Black Holes: the largest energy sources in the Universe, Yerevan, Armenia, June/July 2014.
Talk: Nonlinear Breit-Wheeler process in the collision of a photon with two plane waves
- (15) Erasmus Mundus IRAP PhD school, Nice, France, September 2014.
Talk: On the surface tension of the core-crust interface of neutron stars with global charge neutrality

II b Work With Students

II c Diploma thesis supervision

II d Other Teaching Duties

II e. Work With Postdocs

III. Service activities *[activities carried out in collaboration with ICRANet (e.g. teaching activities, conferences etc...) and outside ICRANet (teaching activities in your university etc...)]*

III a. Within ICRANet

III b. Outside ICRANet

IV. Other

Publications

- [1] J. A. Rueda, Y.-B. Wu, S.-S. Xue, *Surface tension of giant-nucleus compressed atoms*, submitted to Phys. Rev. C.
- [2] Jonas Gunst, Yuanbin Wu, Naveen Kumar, Christoph H. Keitel, Adriana Pálffy, *Direct and secondary nuclear excitation with x-ray free-electron lasers*, Physics of Plasmas 22, 112706 (2015).
- [3] Y.-B. Wu, *On the surface tension and Coulomb energy of neutron-star matter*, J. Korean Phys. Soc. 65, 850 (2014).
- [4] Y.-B. Wu, S.-S. Xue, *Nonlinear Breit-Wheeler process in the collision of a photon with two plane waves*, Phys. Rev. D 90, 013009 (2014).

- [5] J. A. Rueda, R. Ruffini, Y.-B. Wu, S.-S. Xue, *Surface tension of the core-crust interface of neutron stars with global charge neutrality*, Phys. Rev. C 89, 035804 (2014).
- [6] R. Ruffini, Y.-B. Wu, S.-S. Xue, *Einstein-Euler-Heisenberg theory and charged black holes*, Phys. Rev. D 88, 085004 (2013).
- [7] Yuquan Wu, Xiaofei Wang, Yuanbin Wu, *et al.*, *Properties of localization in silicon-based lattice periodicity breaking photonic crystal wave guides*, AIP Advances 3, 112107 (2013).
- [8] G.-Z. Ning, Y.-B. Wu, *Neutrino mass from a higher-dimensional operator*, Chin. Phys. Lett. 28, 061402 (2011).
- [9] Y. B. Wu, Y. F. Wang, X. W. Cao, *Theoretical study of enhanced Raman scattering for stratified concentric silicon-silver nanocylinders*, J. Appl. Phys. 105, 023103 (2009).
- [10] Y. B. Wu, Y. F. Wang, X. W. Cao, *On the enhanced Raman scattering of the nanosize semiconductor: A couple of cylinders (silicon and silver)*, J. Appl. Phys. 106, 053106 (2009).

Yang Xiaofeng



Position: EMJD

Period covered: 2013-2016

I Scientific Work

I used different cosmological probes to constrain cosmology, such as the foundations of modern cosmology and the evolution of universe. A cosmological preferred direction was reported from the type Ia supernovae (SNe Ia) data in recent years. Most gamma-ray bursts (GRBs) have higher redshifts than SNe Ia. We use the long gamma-ray bursts data to give a simple classification of such studies for the first time. Because the maximum anisotropic direction is independent of isotropic cosmological models, we adopt two cosmological models for the hemisphere comparison analysis and LCDM model for dipole fit approach. In hemisphere comparison method, the matter density and the equation of state of dark energy are adopted as the diagnostic qualities in the LCDM model and Λ CDM model, respectively. In dipole fit approach, we fit the fluctuation of distance modulus. We find that there is a null signal for the hemisphere comparison method, while a preferred direction for the dipole fit method. This result indicates that the dipole fit is more sensitive than the hemisphere comparison method. I am working on using GRBs and other probes for investigating the evolution of universe.

II Conferences and educational activities

II a Conferences and Other External Scientific Work

Testing the foundation of modern cosmology from astronomical data: SN Ia and GRB, June 30, 2016, Supernovae, Hypernovae and Binary Driven Hypernovae, An Adriatic Workshop, Pescara June 20-30, ICRANet, Italy

Guilder, September 30, 2016, La Notte Europea dei Ricercatori 2016

II b Work With Students

II c Diploma thesis supervision

II d Other Teaching Duties

II e. Work With Postdocs

III. Service activities

III a. Within ICRANet

III b. Outside ICRANet

IV. Other

2016 List of Publication

Searching for a preferred direction with Union2.1 data

Xiaofeng Yang, F. Y. Wang, Zhe Chu, Monthly Notices of the Royal Astronomical Society (MNRAS), Vol.437, Issue 2, 1840, 2014

Testing the cosmological principle of isotropy: Gamma-ray bursts

Xiaofeng Yang, et al, will submit to MNRAS

Constraint on cosmological parameters: Gamma-ray bursts

Xiaofeng Yang, et al, will submit to MNRAS

CAPES

Brandt Carlos H

Position: PhD student
Period covered: 2017



I Scientific Work

2017 was the year the Brazilian Science Data Center started its activities. During this year we started our first collaboration with the VERITAS project acting as their data provider through a automated system for transmission, verification and publication through the Virtual Observatories network. The spectra data base can be accessed through the BSDC VO interface: <http://vo.bsdc.icranet.org/veritas/q/web/form>.

Following the Open Universe Expert meeting it was time to implement a technological solution for supporting the concepts of science-ready data and citizen-scientists, where the goal is to improve the scientific production through the use of higher-level interfaces to complex/low-level workflows and data-structures. To this goal, we made use of a novel technology called *containers* that hides the computational complexity from the final user. The science case explored focus on the Swift satellite and the high quality data generated by its XRT instrument; we developed a pipeline that combines all events registered by Swift-XRT since its first light. A preliminary scientific product has already been generated: a photometric catalog combining all the observations over the Stripe 82 region. The pipeline and the catalog are publicly available at https://github.com/chbrandt/swift_deepsky and <http://vo.bsdc.icranet.org/sds82/q/web/form>, respectively.

II Conferences and educational activities

II a Participation on the Open Universe Expert meeting, Rome, April 2017.

II b In collaboration with Ulisses Barres, I am co-supervising one Master student in Brazil working on the development of technological components of astronomical data access. Sander Salazar, the student, has developed the next generation interface to retrieve astronomical data from public, isolated data archives, filter the data, ingest in a database and publish through the Virtual Observatory network. The work is a development from the VERITAS workflow, aiming to be the production software for BSDC.

III. Service activities *[activities carried out in collaboration with ICRANet (e.g. teaching activities, conferences etc...) and outside ICRANet (teaching activities in your university etc...)]*

III a. La Notte dei ricercatori, Pescara

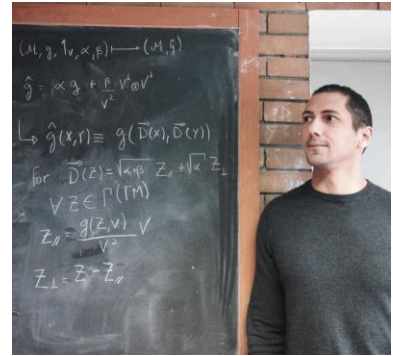
2017 List of Publication

“The Brazilian Science Data Center”, Barres de Almeida U., Giommi P., Brandt C.H., Bodmann B., 2017, ArXiv:1702.06828

Guimarães Carvalho, Gabriel

Position: Ph.D Student (CAPES-ICRANet Program)

Period covered: February 2014 – January 2017



I Scientific Work

Mathematical aspects of general relativity and mathematical physics.

II Conferences and educational activities

II a Conferences and Other External Scientific Work

- IRAP Ph.D Erasmus Mundus Winter School of Nice (France), February of 2014;
- Zel'dovich – 100 Meeting, Minsk (Belarus), March of 2014;
- Les Houches, May of 2014;
- First Scientific ICRANet Meeting in Armenia, June-July of 2014;
- IRAP Ph.D IRAP Ph.D Erasmus Mundus School of Nice (France), September of 2014;
- Fourteenth Marcel Grossmann Meeting , July 2015;

II b Work With Students

See section IV below.

II c Diploma thesis supervision

II d Other Teaching Duties

II e. Work With Postdocs

See section IV below.

15. Other 2016 List of Publication

–“On the disformal invariance of the Dirac equation” (Class. Quantum. Grav. 32, 185016) , joint work with Eduardo Bittencourt and Iarley Pereira.

-“Extended disformal approach in the scenario of rainbow gravity” (Physical Review D 93, 044005) , joint work with Eduardo Bittencourt and Iarley Pereira.

-“Scalar field self-force effects on a particle orbiting a Reissner-Nordström black hole” (submitted) , joint work with D. Bini and A. Geralico.

Pereira Lobo Iarley

Position: CAPES-ICRANet Ph.D. Student
Period covered: 2016



I Scientific Work

I investigate geometrical properties of models used to describe the phenomenology of quantum-gravity. In particular, the role of Planck-scale-dependent deformed kinematics in Special Relativity (named DSR) and its generalization towards possible deformations of General Relativity; I also study the possibility of curved momentum spaces in such paradigm and the role of non-riemannian geometries in the description of quantum gravity phenomenology. Another topic of interest is the use of non-riemannian geometries for the description of alternative theories of gravity.

II Conferences and educational activities

II a Conferences and Other External Scientific Work

April: **BritGrav 16**, Nottingham, UK.

I presented a talk named “Extended disformal approach in the scenario of rainbow gravity”.

May: **Fourth Bego Rencontres IRAP PH.D. Erasmus Mundus school**, Nice, France.

September: **Experimental Search for Quantum Gravity**, Frankfurt, Germany.

II b Work With Students

II c Diploma thesis supervision

II d Other Teaching Duties

II e. Work With Postdocs

III. Service activities

III a. Within ICRANet

III b. Outside ICRANet

IV. Other

2016 List of Publication

G. G. Carvalho, **I. P Lobo** and E. Bittencourt, *Extended disformal approach in the scenario of rainbow gravity*, Phys. Rev. D **93** 044005 (2016), arXiv:gr-qc/151100495.

I. P. Lobo and G. Palmisano, *Geometric interpretation of Planck-scale-deformed co-products*, Int. J. Mod. Phys. Conf. Ser. **41** 1660126 (2016).

I. P. Lobo, N. Loret and F. Nettel, *Rainbows without unicorns: Metric structures in theories with Modified Dispersion Relations*, arXiv:gr-qc/1610.04277, submitted to Phys. Lett. B.

I. P. Lobo, *Frame transformations in Brans-Dicke theory from the viewpoint of Weyl geometry*, arXiv:gr-qc/1610.05004, submitted to Int. J. Mod. Phys. D.

Administrative, Secretarial and Technical Staff

Adamo Cristina



E mail address	cristina.adamo@icranet.org
Telephone	+39 085 23054205
Fax	+39 085 4219252
Nationality	Italian
Date and place of birth	Vibo Valentia, 12 December 1972
<u>Work experiences</u>	
Date	09 November 2009 → present
Name of employer	ICRANet - International Center for Relativistic Astrophysics Network Administrative employee
Main activities and responsibilities	Administrative office: accountancy, preparing reimbursement and rewards for scientific visitors, on – line payments, analysis of bank statements.
Date	04 March 2007 → 09 October 2009
Occupation or position held	Head Administrative Office
Main activities and responsibilities	Account and budget General Account. Active and passive billing cycles. Bank settlement. Treasury management and bank relations management. R.I.B.A. emission. Down-payment and invoice discount management. Payment and takings management. Independent management of the main civil-fiscal fulfilments with a particular attention to the periodical settling and vat statement. General account management. Assets management. Arrangement INTRA model. Arrangement of the financial year ending. Reclassification of the budget. Management of the accounting plan. Implementation of new instruments aiming at improving the efficiency of the administrative services. Administrative management of the staff: recruitment and selection interviews, drawing up of mandatory documents (matriculation and presences books), elaboration of timesheets. Management of clients and suppliers' order. Purchase and choice of suppliers to be qualified. Prices definition, deposit and shipment management.
Name and address of employer	Solaris Srl - Manoppello (PE) - Industrial Springs Production
Date	01 April 2001 - 28 January 2004
Occupation or position held	Responsible for marketing planning
Main activities and responsibilities	Evaluation of markets perspective. Coordination and reduction of commercial plans.

	Survey of the competition sale prices Coordination of marketing plans and commercial budgets
Name and address of employer	Merker SpA - Trucks production
Date	1997 - 2000
Title of qualification awarded	Trainee at a Business Consultant
Principal subjects / occupational skills covered	Ordinary and simplified account. Fiscal fulfilments. European balance. Income tax return. Consultant office Dott. Vincenzo Micozzi - Pescara
Date	1997 - 31/03/2001
Principal subjects / occupational skills covered	Responsible for Quality Insurance (ISO UNI EN 9002) Management Assistance Purchase management Administrative and fiscal fulfilments Definition of Marketing plans and monitoring of mix marketing elements
Name and address of employer	Solaris Srl - Industrial Springs production
Date	1997 - 1997
Occupation or position held	Stageur
Main activities and responsibilities	Implementation of check systems management
Name and address of employer	Software House Polymatic - Chieti Scalo
<u>Education and training</u>	
Date	November 1991 - 16 July 1996
Title of qualification awarded	Degree in Economics – Economics of financial middleman
Name and type of organisation providing education and training	University L.U.I.S.S. - Guido Carli – Roma – Final marks: 105/110 – Thesis: “Tax incentive for the occupational development”
Dates	1986 - 1991
Title of qualification awarded	Secondary School Degree
Name and type of organisation providing education and training	Liceo Scientifico Leonardo Da Vinci - Pescara
Dates	1997 - 2000
Title of qualification awarded	Trainee at a Business Consultant
Main Subjects	Ordinary and simplified account. Fiscal fulfilments. European balance.

	Income tax return.
Name and type of organisation providing education and training	Consultant office Dott. Vincenzo Micozzi - Pescara
Date	1998 - 1998
Title of qualification awarded	Brief Master on Tax Law
Name and type of organisation providing education and training	University D'Annunzio - Pescara
Date	1998 - 1998
Title of qualification awarded	Postgraduate Course on “ European Union: institutional, juridical and economic aspects”
Name and type of organisation providing education and training	European Commission and University of Lyon: corse in Paris and Lyon. Success on final exams.
Dates	1997 - 1997
Title of qualification awarded	Expert in enterprise management
Main Subjects	Purchase and logistics, financing, administration and control, marketing, production, budget, bringing out of new products
Name and type of organisation providing education and training	Regione Abruzzo - CIFAP
Dates	1997 - 1997
Title of qualification awarded	Evaluator of Quality systems
Main subjects	Expert according to the ISO regulations. Qualification for leading controls according to the UNI EN 9002 regulations.
Personal skills and competences	
Mother tongue	Italian
<i>English</i>	Indipendent User
<i>French</i>	Basic User

Social skills and competences	<p>Communication Ability acquired during the working experiences</p> <p>Aptitude to learn, adaptable to new situations, different from the known ones.</p> <p>Ability to work under pressure.</p> <p>Good aptitude to work in multicultural environment thanks to the experiences spent abroad for education or personal reasons.</p> <p>Team spirit</p>
Organisational skills and competences	<p>Innate sense of organisation both in the working place and in the management of personal and familiar life.</p> <p>I am considered as a reference point by the production operators.</p>
Technical skills and competences	<p>Mastery in quality control processes in small enterprises (I was responsible for the quality evaluation)</p>
Computer skills and competences	<p>Good Knowledge of Microsoft Office (Word, Excel e PowerPoint)</p> <p>Very good knowledge of Team System – Gamma, Mult program</p> <p>Basic knowledge of graphic application</p> <p>Good knowledge of Internet and web search engines.</p>

Gabriele Attilio Brandolini



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Nationality Italian
Place and date of birth Ortona (CH), 22 April 1986

Work experiences

Date	01 July 2013 - present
Name of employer	Soabit srl c/o ICRANet - International Center for Relativistic Astrophysics Network
Kind of Employment	System manager
Main activities and responsibilities	Network administrator – Web development
Date	2011 - 2011
Name of employer	Tipografia F.lli Brandolini snc
Kind of Employment	Graphic designer
Main activities and responsibilities	Network administrator Graphic design and layout texts
Date	2010-2010
Name of employer	Soabit srl c/o Univesità degli Studi “G. d'Annunzio” - Chieti
Kind of Employment	Help desk
Main activities and responsibilities	Web development: analysis and development of applications for managing stock of average complexity using PHP and MySQL technologies. Network administrator: support to the installation of network devices and updating of its firmware, to the segmentation of local area network (VLAN 802.1q) and support to troubleshooting activities. Network management: implementation of procedures for the historicizing of traffic flows (NetFlow / PMAcct) generated by the various firewalls on the various local networks.

Date	2009 - 2009
Name of employer	Tipografia Flli Brandolini snc
Kind of Employment	Graphic designer
Main activities and responsibilities	Network administrator Graphic design and layout texts

Education

Date	September 2005 – 18 December 2012
Title of qualification awarded	Degree in Computer Science
Name and type of organisation providing education and training	University of L'Aquila – Final marks: 88/110 Thesis: “Analisi di prestazioni dell'instradamento in reti di sensori wireless”

Dates	September 2009 – July 2005
Title of qualification awarded	Secondary School Degree
Name and type of organisation providing education and training	Istituto Tecnico Industriale Statale “Luigi di Savoia” - Chieti

Personal skills and competences

Mother tongue	Italian
<i>English</i>	Basic User
Social skills and competences	Ability to work in a team matured in many situations where it was necessary collaboration between the figures, both in academia and in the business and sports. Good relational abilities thanks to the past work experience.
Organisational skills and competences	Sense of organization Good experience in project and team management
Computer skills and competences	Excellent knowledge of Operating Systems: Windows, Mac OS X and Linux. Excellent knowledge of Apple and Microsoft applications and Microsoft Office. Excellent knowledge, also, of various graphics and layout software. Excellent ability to use the Internet and manage applications that use them. Management of Local Area Networks LAN and WLAN and implementation of web applications. Excellent knowledge of HTML, PHP, CSS, Javascript, jQuery, MySQL. Good knowledge of C, C++, Java, VPN, Firewalling. Good knowledge of virtualization platforms, with particular reference to XEN Server (v. 7, open-source).

Other skills and competences	Considerable passion for the sport, followed and practiced.
Driving licence	Driving licence cat. A – B.

Ciampaglione Maria

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NATIONALITY

Italian

DATE AND PLACE OF BIRTH

Popoli, 9 September 1983



WORK EXPERIENCE

JUNE 2006

ICRANET – International Center for Relativistic
Astrophysics Network
Secretariat office and communication

APRIL 2014 – MAY 2016

Istituto Nazionale per la Comunicazione - Roma
Social Media Strategist and Digital Strategist PR
•Content strategy for: UNAITALIA (Unione Nazionale
Filiere Agroalimentari Delle Carni e Delle Uova), AIDEPI
(Associazione delle Industrie del Dolce e della Pasta
Italiane) e ASSOBRIRRA (Associazione degli Industriali della
Birra e del Malto)
•Social media strategy for: MasterCard Italia, UNAITALIA,
AIDEPI, ASSOBRIRRA, UNHCR – Alto Commissariato
delle Nazioni Unite per i rifugiati.
•Digital pr for MasterCard, PLAYSTATION Italia,
UNAITALIA, ASSOBRIRRA, AIDEPI, UNAITALIA,
UNHCR – Alto Commissariato delle Nazioni Unite per i
rifugiati

DECEMBER 2013 - MARCH 2014

One Group srl - L'Aquila
Marketing and communication
Consultant in the field of the marketing and the
communication, for publishing activity, press office and for
promotion's project.

NOVEMBER 2011 - NOVEMBER
2013

404 Communication Agency - Roma

Junior Account and Social Media Manager
Press office online, media relations online, brand
monitoring, online web reputation, web analytics e social
media manager for: Warner Bros, Lucky Red, Bolero Film,
Scuderie del Quirinale, Palazzo delle Esposizioni, Ministero
dei Trasporti e delle infrastrutture, ANICA, Motion Picture
Association of America, UNIVIDEO.

MAY2011 A NOVEMBER 2011

PMS – Financial and Corporate Communications - Milano
Junior Account
Press Office corporate, media relations online, brand
monitoring, online web reputation, web analytics e gestione
crisis management for: Barclays, ATM (Servizio di trasporti
pubblici Milano), Chiomenti Studio Legale, Alpha Private

Equity, Fondo ReEnergy Capital.

EDUCATION

NOVEMBER 2010 – MAY 2011

12° Master Media Relations e Comunicazione digitale (Full time) Business School del Sole 24 ORE, Milano
Press Office, Media relation online, Digital
Communication, I Social Media, Web Community,
Financial Communications, Crisis Management, Public
Communication

MARCH 2008 - APRIL 2010

Università degli Studi di Roma La Sapienza
Faculty of Political Science – Degree in Careers and
International Functions

FEBRUARY 2008

Università degli Studi di Roma La Sapienza
Faculty of Political Science – Degree in Political Science and
International Relationsi

JUNE 2002

Liceo Classico Ovidio di Sulmona

PERSONAL SKILLS AND COMPETENCES

Mother tongue

Inglese

Francese

Italian

Good

Good

Social Skills

Good Relational abilities handling nei precedenti lavori and
good apitude to work in team.

Computer Skills and competences

Very good command of Microsoft Office (Word, Excel and
Power Pont) Very good knowledge of Internet and web
search engines.



Di Berardino Federica

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E-MAIL	federica.diberardino@icranet.org
NATIONALITY	Italian
DATE AND PLACE OF BIRTH	31-03-1980 PESCARA

WORK EXPERIENCE

November 2005-present

- Head of Secretariat at ICRANet Pescara: supporting Director, responsible for day-to-day tasks and secretarial duties, overall responsibility for the smooth running of the secretarial office; supervising the work of office juniors and provide advice and training to them; organizing business travels, itineraries and accommodation; organizing and preparing agendas for board/scientific committee meetings, providing facilities, taking minutes; updating processing and filing of documents (both on paper and computer); organizing diaries and making appointments; handling incoming/out coming calls, faxes, e-mails inquiries and post; handling requests for information and data; coordinating and scheduling secretarial tasks; translations; arranging interviews for new administrative/secretarial staff recruitment.

May-October 2005
September-June 2005
April 2005

- Travel Agent at “Beg Viaggi” Pescara;
- Italian language trainer for foreign students;
- Congress Hostess for IN FIERA S.r.l., at “ECOTUR 2005”- Montesilvano;

December 2004

- Congress Hostess for Manoppello Municipality (PE) on the occasion of the commemoration “Marcinelle 2005”;

October-December 2004

- Customer service assistant for Terravision S.r.l. at *Aeroporto d'Abruzzo*, Pescara;

January-December 2004

- Trainer/Supporter to elementary and high school Italian students for English language homeworks;

May 2004

- Translations from/to English;
- Distribution of books in the local schools for Ajilon Agency,

SOCIAL-CULTURAL
EXPERIENCES

January-March 2005: Trip to Vanuatu (Melanesian archipelago, former “New Hebrides”) for humanitarian-aid experience. Voluntary work in a few islands of the archipelago and elementary-level learning of local idiom, the Bislama.

PERSONAL SKILLS

Main studies and job experiences focused on foreign cultures and languages. Graduation on Spanish and English. Daily practice with both languages through conversation and readings. Good interpersonal and communications skills (both written and oral). Well presented.

MOTHER-TONGUE
OTHER LANGUAGES

ITALIAN
ENGLISH, SPANISH, FRENCH

RELATIONAL ABILITIES

Good attitude to work in multi-cultural contexts.
The two main training experiences in the US high school and later in college supported the personal and professional growth, helped to acquire an open-minded attitude towards other cultures, which are essential for cooperation and mutual respect.
The work as customer service assistant, hostess and sales promoter have been relevant in acquiring professional skills in the relationship with customers: importance of communication, which is the ability to listen to and to be listened.

ORGANIZING, PERSONAL AND
OTHER COMPETENCES

Organizing abilities in team-work, accuracy, punctuality, positive attitude, problem-solving skills and working method based on the achievement of goals. Open and charismatic personality, highly resourceful, motivated, flexible, enthusiastic, active, dynamic, loving challenges. Ability to multitask and managing conflicting demands. Able to work to tight deadlines. Quick learner. Working at ICRANet consented to be experienced in coordinating, planning and organizing a wide range of secretarial activities, and in being a well organized good team-player with a proven ability to work proactively even whilst under pressure and in a complex and busy office environment.

TECHNICAL SKILLS

Computer competences: good knowledge of Windows. Daily use of Outlook, Thunderbird, Word, Excel, Power Point and FileMaker database.
2004: Certificate for Informatics Course on “Basic Office” (Word, Excel, Internet e E-mailing) organized by: “E-Work”, Pescara in cooperation with “Ok Work”, Milano.

ARTISTIC SKILLS

Photography: Diploma of Basic and advanced courses, Photo-reportage and work flow.
Dance. Music.
Free time: art, music, travel and photography.

DRIVING LICENCE

Driving license cat. B

di Niccolo Cinzia

E mail address cinzia.diniccolo@icranet.org
Telephone +39 085 23054 219
Fax +39 085 4219252
Nationality Italian
Date and place of birth Terlizzi, 23 May 1985



Work experiences

Date	01 August 2013 → present
Name of employer	ICRANet - International Center for Relativistic Astrophysics Network
Main activities and responsibilities	Secretariat Office
Date	12 June → 16 July 2013
Occupation or position held	ISTAO – Project Work
Main activities and responsibilities	Report And Presentation Of The Results Loccioni Group – Our Presence In The World: Germany, USA, China; Country Analysis: Turkey. Results, Report And Final Slide Presentation To Loccioni Managers
Name and address of employer	Loccioni Group, via Fiume 16, 60030 Angeli di Rosora, Ancona Phone +39.0731.8161 Fax +39.0731.814.700
Date	From October 2012
Occupation or position held	Conference interpreting and translations.
Name and address of employer	OS-Card Srl – Bologna
Date	May 2012 → September 2012
Occupation or position held	Junior Export Manager
Main activities and responsibilities	Brazil country analysis. Brazilian Portuguese website translation. Company profile in Brazilian Portuguese language.
Name and address of employer	Marzoarreda – Novoli (LE)
Date	September 2011 → January 2013
Occupation or position held	Stageur
Main activities and responsibilities	Legal Office – Notary services Drafting of documents concerning: general/special power of attorney, will and testament of citizens living abroad, public acts, certificates of

authentications, self-certifications and official certificates that can be replaced by self-certifications.

Name and address of employer Italian General Consulate in Brazil – São Paulo
Avenida Paulista, 1963; CEP 01311-300 São Paulo (SP)

Date October 2011 → January 2012

Occupation or position held Italian teacher

Main activities and responsibilities Italian teacher for native Brazilian students.
Private lessons and classes.

Conference interpreter for 30th São Paulo *Venice Architecture Biennial* 2012

Name and address of employer Italian Institute of Culture in Brazil – São Paulo
Avenida Higienópolis, 436; CEP 01238-000, São Paulo (SP)

Date January → July 2011

Occupation or position held Internship

Main activities Editing, proofreading.

Name and address of employer Edizioni dell'Urogallo – Literature from Portuguese-speaking countries

Education and training

Date February → July 2013

Title of qualification awarded Postgraduate master course in International Management

Name and type of organisation providing education and training ISTAO – Istituto Adriano Olivetti di Studi per la gestione dell'economia e delle aziende

The Masters Course in International Management prepares highly specialized students in the field of international business and trade. Organized in collaboration with ICE (Governmental Agency for the internationalization of Italian companies), Confindustria Marche (Italian Employers' federation) and the Government of the Marche Region, the Master represents one of the most important and valuable programs for new graduates approaching the business world focused on the themes of internationalization: macroeconomics and global markets, enterprise organization, emerging countries, strategies and decision-making skills, contracts, rules, techniques.

Date May 2012

Title of qualification awarded CEDILS Certificate
Certified teacher for Italian as foreign language

Name and type of organisation providing education and training Ca' Foscari – University of Venice

Date	November 2008 → 11 July 2011
Title of qualification awarded	Master degree in <i>Languages for international communication – Portuguese EU/BR and Spanish</i>
Name and type of organisation providing education and training	Univerità degli Studi di Perugia Final marks: 110/110 cum laude Thesis: “Way to Europe. Portugal and the European integration process”

Date	November – December 2010
Title of qualification awarded	Brief Master on Europroject Management 2007-2013
Name and type of organisation providing education and training	Introduction to European Union: institutional, juridical and economic aspects. Training courses: full lifecycle of an EC funded project: proposal preparation and submission, evaluation, negotiation, technical and financial project management, reporting, technical reviews and post-project audits.

Date	November 2004 → 9 November 2008
Title of qualification awarded	Degree in <i>Linguistic and Cultural Mediation Sciences – Portuguese EU/BR and Spanish</i>
Name and type of organisation providing education and training	Univerità degli Studi di Perugia Final marks: 110/110 cum laude Thesis: Modern poetry in Portugal.

Dates	1999 - 2004
Title of qualification awarded	Secondary School Degree
Name and type of organisation providing education and training	Liceo Linguistico Carlo Troya – Andria (BT)

Personal skills and competences

Mother tongue	Italian
<i>Portuguese</i>	Second language
<i>Spanish</i>	Very good
<i>English</i>	Good
<i>French</i>	Basic User

<u>Social skills and competences</u>	Good ability to adapt to multicultural environment, gained through my experience of studying and travelling abroad (Brazil and Europe); Very good aptitude in teamwork (working within collective projects in the postgraduate course and in academia); Ability to work under pressure.
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<u>Organisational skills and competences</u>	<p>Very good sense of organisation and time planning abilities;</p> <p>Self rigorousness and self discipline;</p> <p>Good analytical and problem-solving abilities gained during all study years and especially during internship at Italian General Consulate in Brazil (the Vice-Consul signed my letter of recommendation)</p>
<u>Computer skills and competences</u>	<p>Very good command of Microsoft Office (Word, Excel e PowerPoint);</p> <p>Very good knowledge of Internet and web search engines;</p> <p>Knowledge of graphic application.</p>

Latorre Silvia



PERSONAL INFORMATION

Place and date of birth	Chieti, 23/09/1982
Nationality	Italian
E- mail	silvia.latorre@icranet.org
Phone	085 – 23054223
Fax	085 - 4219252

WORK EXPERIENCES

- | | |
|----------------------|--|
| • Date | 12/02/2008 – present |
| • Name of employer | ICRANet |
| • Firm or Sector | International Center for Relativistic Astrophysics Network |
| • Kind of Employment | Administrative employee |
| • Main Tasks | Managing the relationship with suppliers, controlling invoices, calculating reimbursement and rewards for our scientific visitors, preparing orders for the bank, executing and verifying on-line payments, meeting our bank referents for particular payment operations, cash holding, using ICRANet cost-accounting system. |
| • Date | 01/12/2006 – 20/01/2008 |
| • Name of employer | DelVerde Industrie Alimentari S.p.A. |
| • Firm or Sector | Pasta Factory |
| • Kind of Employment | Trainee |
| • Main Tasks | Study and analysis of annual financial statements of ten competitor pasta factories for the financial years from 2002 to 2006, as well as reclassification of balance sheets and profit and loss accounts and calculation of the main income and financial indexes. Analysis of export strategies of DelVerde and other Italian pasta factories. |

EDUCATION

- | | |
|--------------------------|---|
| • Date | 11/2005 – 12/2007 |
| • Institution | Università degli Studi “G. D’Annunzio” Pescara |
| • Main Subjects | Marketing, commercial law, innovation management and economics, business statistics, quality technique and theory |
| • Achieved Qualification | Degree in Economics and Administration of the enterprises. Final thesis in analysis of balance sheet: “ <i>La leva finanziaria e la leva operative nel settore pastario</i> ” (supervisor Prof. Michele A. Rea) |
| • Mark | 110/110 <i>cum laude</i> |
| • Date | 09/2001 – 11/2005 |
| • Institution | Università degli Studi “G. D’Annunzio” Pescara |
| • Main Subjects | Financial Mathematics, bank technique, business economics, accountancy, microeconomics, macroeconomics, private and public law, work law, analysis of balance sheet, business strategy and politics |
| • Achieved Qualification | Business Economics Degree. Final thesis in business strategy and politics: “ <i>Gli strumenti di analisi strategica: l’analisi SWOT</i> ” (supervisor Prof. Michele A. Rea) |
| • Mark | 106/110 |

<ul style="list-style-type: none"> • Date • Institution • Main Subjects • Achieved Qualification • Mark 	<p>09/1996 – 07/2001</p> <p>Secondary School focusing on sciences- Liceo Ginnasio Statale “Publio Virgilio Marone” Vico del Gargano (FG)</p> <p>Mathematics analysis, Italian language and literature, Latin language and literature, Chemistry, Physics</p> <p>Scientific school-leaving certificate</p> <p>100/100</p>
FOREIGN LANGUAGES	ITALIAN
MOTHER-TONGUE	
OTHER LANGUAGES	ENGLISH (GOOD) – FRENCH (ELEMENTARY)
RELATIONAL ABILITIES	<p>Good relational abilities thanks to the past work experience at DelVerde and to the present experience at ICRANet.</p> <p>Self-reliant.</p> <p>Good listener.</p>
ORGANIZING COMPETENCES	<p>Good organizing abilities acquired handling the big amount of data at DelVerde and working at ICRANet, where they are essential for managing the large number of guests, mainly during the meetings.</p>
TECHNICAL SKILLS	<p>Computers competences: Windows. Softwares: Word, Excel, Power Point. Very good use of Internet and e-mail accounts.</p> <p>Good use of cost-accounting system HELPAZI and bank system BNL Businessway.</p> <p>Elementary knowledge of HTML e CSS programs for websites.</p> <p>Knowledge of “TOP VALUE” program for financial diagnosis and corporate planning.</p>
ARTISTIC SKILLS	Piano classes attended for 8 years. sol-fa Diploma.
DRIVING LICENCE	Driving licence cat. B
FURTHER INFORMATION	I like travelling, cooking, cinema, listening music, playing the piano. I have a determined, dynamic and flexible personality. I like staying and working with people.

PERSONAL INFORMATION

Damiano Verzulli



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 +39 3495893862 ("Telegram" enabled)

 damiano@verzulli.it

Date of birth Sep. 28th, 1971 | Nationality Italian

WORK EXPERIENCE

from may 2003, up to now

System & Network specialist (Consultant)

Università degli Studi "G. d'Annunzio" di Chieti-Pescara, Chieti (Italia)
<http://www.unich.it>

- Network management (3.300 interconnected hosts distributed around hundreds VLAN and 7 remote sites; 3x1Gbps Internet backbone [GARR]; a layered server farm focused on both services and security): monitoring, fixing, capacity planning;
- System management, with particular focus to the university e-mail platform (several servers; 2.500 mailboxes; more than 4TB of on-line storage) and virtualization environment (more than 30 VMs powered by a (phasing-out) vmWare ESX cluster and a (increasingly adopting) XEN Server 7 environment);
- System management of the underlying hardware infrastructure: DELL Blade Center m1000e with related blade-servers; an EMC² SAN (one storage array with four additional enclosures); a multilayer backup infrastructure; a web-hosting platform (several LAMP stacks); various other IT systems (logging, monitoring, TTS, VPN, etc.);
- Security management: ensuring proper security levels among all layers of ICT infrastructures:
 - Layer 2: wired 802.1x; wireless 802.1x; Radius AAA infrastructures;
 - Layer 3: firewalling, security assessment, Network-based Intrusion Detection Systems, ip-flow analysis (*NetFlow/IPFIX, SFLOW*) with particular focus on BotNet detection;
 - Layer 4 – Layer 7: Host-based Intrusion Detection Systems; Log analysis; Application specific vulnerabilities and patching; web-platforms hardenization (*Apache mod-security and reverse proxies*); incident handling and response, including source code-analysis of (web-based) malware;
 - Cross-layers: infrastructure planning and deployment (virtual infrastructures [*Vmware, XEN*] and related deployment [Hardware, Networking, Clustering, VM deployments, Backup & D/R])
- 2° level support towards underlying software stacks, with a particular focus to "open-source" technologies (linux, apache, mysql, php, rsyslog, pmacct, nagios, munin, postfix, courier, etc.);

april 2010 - august 2010

IT Specialist

MIUR – Italian Ministry of Education, Universities and Research

- Member of the technical-staff established by the Italian Ministry of Education, University and Research to plan and conduct the Five-Year Research Evaluation 2004-2008 Exercise [1]

[1] <http://civr.miur.it/en/vqrteam.html> - <http://civr.miur.it/en/index.html>

april 2010– december 2013

IT Specialist

MIUR – Italian Ministry of Education, Universities and Research

- External member of the technical-committee of the “Università Digitale” project, funded by the Italian Department of Public Administration and Innovation and involving ICT development and cooperation among 23 Italian universities and the Italian Ministry of Education, Universities and Research.

As an external member, he attended 15 meetings and directly supported the communication within the group by creating and managing several mailing-lists and a private intranet/website;

March 2005 - march 2007

Project Manager - TOSSAD (FP6)

- Project Manager for TOSSAD – Towards Open Source Software Adoption and Dissemination -, an EU project funded under the FP6 IST program (Contract No. 015981 signed on march 22nd 2005) whose objective was “...to start integrating and exploiting already formed methodologies, strategies, skills and technologies in F/OSS domain in order to help governmental bodies, educational institutions and SMEs to share research results, establish synergies, build partnerships and innovate in an enlarged Europe...” .

In TOSSAD he was involved in WorkPackage 3, leading the delivery process of several project-deliverables.

september 1999 – february 2003

Project Manager and Team Leader

Nextra Spa (a former Telenor Norway Company), Casalecchio di Reno (BO) - Italy

- Web-development Team Leader, coordinating a team of 5 to 12 people;
- Project Manager for various web-portal contracts;
- Local contact point, towards "corporate", for all the issues related to web-development software technologies and web-development hardware and system infrastructures.
- System administrator of the web-hosting platform.

As such he had the chance to often travel abroad, all-around other Nextra Europe sites as well as to corporate headquarter, in Norway.

May 1996 – august 1999

Internet Application Developer

CINECA - Consorzio Interuniversitario, Casalecchio di Reno (BO) - Italy

- Web developer (Perl/CGI; PHP; Postgresql; MySQL);
- Junior sysadmin for IRIX and HP-UX platforms powering the web-hosting services;

EDUCATION AND TRAINING

1991 - 1995

Computer Science degree

University of L'Aquila – Italy - with full marks (110 cum laude)

The thesis titled “Multidimensional Interval Routing techniques” researched some routing topics in specific network environments.

PERSONAL SKILLS

Mother tongue(s) Italian

Other language(s)

	UNDERSTANDING		SPEAKING		WRITING
	Listening	Reading	Spoken interaction	Spoken production	
English	C1	C1	C1	B2	B2

Levels: A1/2: Basic user - B1/2: Independent user - C1/2 Proficient user
Common European Framework of Reference for Languages

Organisational / managerial skills

- Significant project-management attitude and skills mainly thanks to previous working experience, also in multicultural/international team;
- Being able to (comfortably) speak to both technical and non-technical targets, even within medium/large conferences. As an example:
 - 2005: "Free Software World Conference" - 26/10/2005, Badajoz, Spain
 - 2009: "GARR Workshop" - 17/06/2009, Rome, Italy
- Being able to present/discuss deeply technical topics to non-technical decision-makers (CEOs, CFOs, etc.);
- Presenting an uncommon balance between technical knowledge, capacity to deliver, team-working and customer satisfaction.

Computer skills

- Deep knowledge of Linux-based systems;
- Good knowledge of Microsoft "server" platforms (Domain, Active Directory, etc.), with particular reference to the interoperability/integration with Linux environments;
- Deep knowledge of networking technologies, ranging from Layer 2 (Ethernet) up to Layer 7 Internet protocols (HTTP, FTP, SMTP, SNMP, DNS, NTP, SYSLOG, POP/IMAP, SSL, etc.);
- Good "web programming" skills, mainly as PHP and PERL development but also with respect to current/modern WEB 2.0 pattern (AngularJS and other Javascript platforms/frameworks, Bootstrap CSS, NoSQL);
- Good knowledge of DBMS technologies, with particular reference to SQL language and MySQL/MariaDB engine;
- Good knowledge of collaborative development technologies (GIT);
- Good knowledge of virtualization platforms, with particular reference to VMware ESX/vSphere and XEN Server (v. 7, open-source);
- Deep knowledge of the Open-Source and Free Software movements, with particular reference to their impact towards Public Administrations and, more in general, to the Society as a whole.

ADDITIONAL INFORMATION

Additional information

- Very “open minded” and “technology” addicted;
- Really interested in the security side of the Internet technologies, especially related to web-security (web application vulnerabilities) and network traffic analysis (BotNet detection);
- “Arduino” and “ESP8266” microcontroller addicted. Really interested in deepen related know-how, especially regarding the current and future IoT trends;
- Member of the great StackExchange community, with particular reference to the ServerFault portal (<http://serverfault.com/users/251104/damiano-verzulli> ; 5 questions and 50 answers for a 1916 current score);
- Aiming to work in multicultural and multiethnic context, better if in “international” groups/companies;
- he'd like to be involved as project-manager for medium/large projects, better if in medium/large "global" companies, even better if with Free/Open-Source-Software as a common base for such projects;
- he would like to continue to broaden his knowledge about Internet technologies and to always “stay-inline” with technology news and trends.