Faculty, Adjunct professors, Research scientists,

Visiting scientists, Lecturers, PhD students, Post-doc

and Staff

at the Pescara Center

December 2020

Contents

ICRANet Faculty Staff

Barres de Almeida, Ulisses	CBPF, Rio de Janeiro, Brazil
Belinski, Vladimir	ICRANet
Bianco, Carlo Luciano	ICRANet and Università di Roma "Sapienza"
Cherubini, Christian	ICRANet and University Campus Bio-medico, Italy
Damour, Thibault	IHES, France
Della Valle, Massimo	INAF-Napoli - Osservatorio Astronomico di Capodimonte, Italy
Filippi, Simonetta	ICRANet and University Campus Bio-medico, Italy
Giommi, Paolo	ASI Science Data Centre, Italy
Jantzen, Robert	AbrahamTaub-ICRANet Chair and Villanova University, USA
Kerr, Roy P.	Yevgeny Mikhajlovic Lifshitz - ICRANet University of Canterbury, New Zeland
Moradi, Rahim	ICRANet
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

Ansoldi, Stefano	University of Udine
Arguelles, Carlos	ICRANet
Barres de Almeida, Ulisses	CBPF, Rio de Janeiro, Brazil
Berezhiani, Zurab	Università degli studi dell'Aquila, Italy
Bini, Donato	CNR, Italy
Boshkayev, Kuantay	ICRANet
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
Cherubini, Christian	ICRANet and Campus Biomedico, Italy
Della Valle, Massimo	Osservatorio di CapodiMonte, Italy
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
Geralico, Andrea	ICRANet and Università di Roma "Sapienza", Italy
Giommi, Paolo	ASI, Italian Space Agency
Karlica, Mile	ICRANet, University of Nova Gorica Lev Davidovich Landau - *ICRANet Chair*
Kleinert, Hagen	Richard Feynmann - ICRANet Chair, Freie Universitat Berlin
Kerr, Roy	Yevgeny Mikhajlovic Lifshitz - ICRANet Chair and University of Canterbury, New Zeland
Lee, Hyung Won	Inje University, Korea
Malheiro, Manuel	ITA, Brazil
Mansouri, Reza	Sharif University of Technology

Mathews, Grant	University of Notre Dame
Merafina, Marco	University of Rome La Sapienza, Italy
Mirabel, Felix	CEA
Muccino, Marco	ICRANet
Pak-Hin, Tam	Sun Yat-sen University, China
Picanço Negreiros, Rodrigo	Universidade Federal Fluminense, Brazil
Piran, Tsvi	Yuval Neeman-ICRANet Chair and the Hebrew University, Israel
Prakapenia, Mikalai	B.I. Stepanov Institute of Physics, NASB, ICRANet-Minsk
Punsly, Brian Mathew	Mathew California University, Los Angeles USA
Rafelski, Johann	University of Arizona, USA
Quevedo, Hernando	Institute of Nuclear Science, UNAM
Qadir, Ashgar	National University of Sciences and Technology - Pakistan
Sigismondi, Costantino	ICRANet
Sobouti, Yousef	Institute for Advanced Studies in Basic Sciences, IASBS, Iran
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
Jing, Yi-Peng	Shangai Astronomy Observatory
Lee, Chul Hoon	Hanyang University, Seoul, Korea
Lee, Hyun Kyu	Department of Physics, Hanyang University, Korea
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

Benetti, Micol	ICRANet
Bernardini, Maria Grazia	ICRANet and Università di Roma "Sapienza", Italy
Lattanzi, Massimiliano	University of Oxford and ICRANet
Patricelli, Barbara	ICRANet and Università di Roma "Sapienza", Italy
Rotondo, Michael	ICRANet and Università di Roma "Sapienza", Italy

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
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
Belczynski, Chris	Nicolaus Copernicus Astronomical Center, Poland
Bernal, Cristian Giovanny	Universidad Nacional Autónoma de México (UNAM), Mexico
Blinne, Alexander	University Jenna, Germany
Boçi, Sonila	University of Tirana, Albania
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	C entro 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
Kilin, Sergei	National Academy of Sciences of Belarus
Kim, Hongsu	KASI
Kim, Hyeong-Chan	Chungju National University
Kim, Hyuong Yee	INJE, South Korea
Kim, Jin Young	Kunsan National University
Kim, Sang Pyo	Kunsan National University, Republic of Korea
Lecian, Orchidea Maria	Sapienza University of Rome, Italy
Lee, Chang-Hwan	Pusan National University
Lee, Hyung Won	Inje University
Lee, Wonwoo	Cquest, Sogang University
Lin, Wenbin	Southwest Jiaotong University, Chengdu, China
Mahmoudikooshkeqazi, Somayyeh	Shiraz University, Iran
Modaresvamegh, Saeidehalsadat	Shiraz University, 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
Muhsin Burhan Mohammed Rashid Al-Jaf	University of Science and Technology of China - Hefei
Nagataki, Shigehiro	Yukawa Institute for Theoretical Physics, Kyoto University
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
Peqini, Klaudio	University of Tirana, Albania
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 Martinez, Aurora	Instituto de Cibernetica Matematica Y Fisica, Cuba
Piechocki, Wlodzimierz	Institute for Nuclear Studies - Poland
Pinto Neto, Nelson	Centro Brasileiro de Pesquisas Físicas, Brazil
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 Radioastronomia IAR-CONICET, Argentina
Sasaki, Misao	Kyoto University, Japan
Shakeri, Soroush	Isfahan University of Technology, Iran
Soares Maia, Clovis Achy	Universidade de Brasília, DF, Brazil
S. O. Kepler	Universidade Federal do Rio Grande do Sul, Brazil
Tahvildarzadeh, Abdolreza	Rutgers, the State Univeristy of New Jersey, USA
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 Fisica, Bogotà, Colombia
Torrieri, Donato Giorgio	Universidade Estadual de Campinas, Brazil

Tizchang, Seddigheh	Isfahan University of Technology, Iran
Vallejo Peña, Sergio Andrés	Universidad de Antioquia Medellín, Antioquia, Colombia
Van Putten, Maurice	Korean Institute for Advanced Study, South Korea
Vyblyi, Yuri	B.I. Stepanov Institute of Physics, Republic of Belarus
Yang, Jongmann	Ieu, Ewha Womans University
Yeom, Dong-Han	Cquest, Sogang University
Zalaletdinov, Roustam	Dept. of Theoretical Physisc, Institute of Nuclear Physics, Uzbek Acadeny of Sciences, Uzbekistan
Zheng, Yunlong	University of Science and Technology of China
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	
Pugliese, Daniela	Italy
Sigismondi, Costantino	Italy
Siutsou, Ivan	Belarus
Seventh Cycle	*2008-2011*
Belvedere, Riccardo	Italy
Ceccobello, Chiara	
Ferrara, Walter	Italy
Han, Wen-Biao	China
Luongo, Orlando	Italy
Pandolfi, Stefania	Italy
Taj, Safia	Pakistan
Eighth Cycle	*2009-2012*
Boshkayev, Kuantay	Kazakhstan

Bravetti, Alessandro	Italy
Haney, Maria	Germany
Lombardi, Caterina Antonietta	Italy
Menegoni, Eloisa	Italy
Sahakyan, Narek	Armenia
Sahini, Sahil	India

Ninth Cycle	*2010-2013*
Arguelles, Carlos	Argentina
Benetti, Micol	Italy
Muccino, Marco	Italy

Tenth Cycle	*2011-2014*
Cáceres Uribe, Diego Leonardo	Colombia
Wang, Yu	China

Eleventh Cycle	*2012-2015*
Barbarino, Cristina	Italy
Cipolletta, Federico	Italy
Dichiara, Simone	Italy

Twelfth Cycle	*2013-2016*
Becerra, Laura	Colombia
Harutyunyan, Vahagn	Armenia

Thirteenth Cycle	*2014-2017*
Moradi, Rahim	Iran
Rodriguez Ruiz, Jose Fernando	Colombia

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

Fifteenth Cycle	*2016-2019*
Baghmanyan, 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

Sixteenth Cycle	*2017-2020*
Becerra Vergara, Eduar Antonio	Colombia
Carinci, Massimo Luca Emiliano	Italy
Prakapenia, Mikalai	Belarus
Yunis, Rafael Ignacio	Argentina

IRAP Ph. D. Erasmus Mundus Students

First Cycle	*2010-2013*
Baranov, Andrey	Russia
Benedetti. Alberto	Italy
Dutta, Parikishit	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
Second Cycle	*2011-2014*
Begue, Damien	France
Dereli, Husne	Turkey
Gregoris, Daniele	Italy
Iyyani, Shabnam Syamsunder	India
Pereira, Jonas Pedro	Brazil
Pisani, Giovanni	Italy
Rakshit, Suvendu	India
Sversut Arsioli, Bruno	Brazil
Wu, Yuanbin	China
Third Cycle	*2012-2015*
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
Fourth Cycle	*2013-2016*
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
Fifth Cycle	*2014-2017*
Aimuratov, Yerlan	Kazakhstan
Chang, Yu-Ling	Taiwan

Delgado, Camilo	Colombia
Efremov, Pavel	Russia
Karilca, Mile	Croatia
Krut, Andreas	Germany
Martinez Aviles, Gerardo	Mexico

CAPES Students

First Cycle	*2013-2016*
Brandt Carlos Henrique	Brazil
Guimarães Carvalho Gabriel	Brazil
Pereira Lobo Iarley	Brazil

Administrative and Secretarial Staff

ICRANet - Pescara

Adamo, Cristina	Administrative Office
Brandolini, Gabriele	System Manager
Di Niccolo, Cinzia	Secretariat
Latorre, Silvia	Administrative Office
Natale, Elisabetta	Secretariat

ICRANet Faculty Staff

Cherubini Christian

Position: Associate Professor in Mathematical Physics (MAT/07).
Department of Science and Technology for Humans and the Environment
Laboratory of Nonlinear Physics and Mathematical Modeling
University "Campus Bio-Medico di Roma",
Via A. del Portillo 21, I-00128 Rome, Italy
and
Adjunct Professor in ICRANet Faculty.

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

I Scientific Work

- Electrodynamics and magnetohydrodynamics around black holes;
- Selfgravitating systems;
- Mathematical Biology.

II Conferences and educational activities

II a Conferences and Other External Scientific Work

- Fourth Zeldovich virtual meeting organized by ICRANet and the National Academy of Sciences of Belarus, September 2020 (chairman)

II b Work With Students

II c Diploma thesis supervision

II d Other Teaching Duties

II e. Work With Postdocs

In 2020 Prof. Cherubini has collaborated with Dr Moradi, Dr Rueda and several other ICRANet scientists on problems of electrodynamics around black holes and on selfgravitating systems. The collaboration on these topics is still ongoing.

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."

III b. Outside ICRANet

- Lecturer "Electromagnetism" (Departmental Faculty of Engineering, University Campus Bio-Medico of Rome).
- Lecturer "Mathematical Physics Models for Engineering" (Departmental Faculty of Engineering, University Campus Bio-Medico of Rome).
- Lecturer "Rational Mechanics Laboratory" (Engineering Departmental Faculty, University Campus Bio-Medico of Rome) (supplementary teaching).
- Lecturer (2CFU only) "Mathematics" in the integrated course of Mathematics and Computer Science (Department of Science and Technology for Humans and the Environment, University Campus Bio-Medico of Rome).

IV. Other

Prof. Cherubini has a longstanding collaboration with other ICRANET scientists. In particular, in collaboration with Dr D. Bini, Prof. R. T Jantzen, Prof. R. Ruffini and Dr. J.A. Rueda, he has written several articles in various areas of General Relativity. With Prof. S. Filippi he is involved in research activities in the fields of Stellar and Galactic Structures, Effective Geometries and Complex Systems in Nature with a specific focus in biophysics.

2020 List of Publications

- Loppini A, Cherubini C, Bertolaso M, Filippi S (2020). Breaking down calcium timing in heterogenous cells populations. BIOSYSTEMS, vol. 191-192, p. 1-7, ISSN: 0303-2647, doi: https://doi.org/10.1016/j.biosystems.2020.104117
- Ruiz-Baier R, Gizzi A, Loppini A, Cherubini C, Filippi S (2020). Modelling Thermo-Electro-Mechanical Effects in Orthotropic Cardiac Tissue. COMMUNICATIONS IN COMPUTATIONAL PHYSICS, vol. 27, p. 87-115, ISSN: 1991-7120, doi: 10.4208/cicp.OA-2018-0253
- Loppini A, Gizzi A, Cherubini C, Fenton F H, Filippi S (2020). Temperature effects and correlation analysis in cardiac tissue. In: 2014 8th Conference of the European Study Group on Cardiovascular Oscillations (ESGCO) . p. 1-2, Institute of Electrical and Electronics Engineers Inc., Pisa, doi: 10.1109/ESGCO49734.2020.9158021

Filippi Simonetta

Position: Full Professor in Theoretical Physics (FIS/02)
Departmental Faculty of Engineering
University Campus Bio-Medico of Rome,
Head, Laboratory of Nonlinear Physics and Mathematical Modeling
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

- Electrodynamics around black holes and self-gravitating systems.
- Theoretical biophysics.

II Conferences and educational activities

II a Conferences and Other External Scientific Work

- Fourth Zeldovich virtual meeting organized by ICRANet and the National Academy of Sciences of Belarus, September 2020 (chairman)

II b Work With Students

II c Diploma thesis supervision

II d Other Teaching Duties

II e. Work With Postdocs

In 2020 Prof. Filippi has collaborated with Dr Rueda, Dr Moradi and other ICRANet scientists studying the electrodynamics around black holes and some topics of selfgravitating systems. These studies are still in progress.

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 "Rational Mechanics Laboratory" (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.

2020 List of Publications

- Loppini A, Cherubini C, Bertolaso M, Filippi S (2020). Breaking down calcium timing in heterogenous cells populations. BIOSYSTEMS, vol. 191-192, p. 1-7, ISSN: 0303-2647, doi: https://doi.org/10.1016/j.biosystems.2020.104117
- Ruiz-Baier R, Gizzi A, Loppini A, Cherubini C, Filippi S (2020). Modelling Thermo-Electro-Mechanical Effects in Orthotropic Cardiac Tissue. COMMUNICATIONS IN COMPUTATIONAL PHYSICS, vol. 27, p. 87-115, ISSN: 1991-7120, doi: 10.4208/cicp.OA-2018-0253
- Loppini A, Gizzi A, Cherubini C, Fenton F H, Filippi S (2020). Temperature effects and correlation analysis in cardiac tissue. In: 2014 8th Conference of the European Study Group on Cardiovascular Oscillations (ESGCO) . p. 1-2, Institute of Electrical and Electronics Engineers Inc., Pisa, doi: 10.1109/ESGCO49734.2020.9158021

Punsly

Position: Research Scientist
Period covered: 10/2019 – 10/2020

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 2020. The research was directed at finding environmental factors that are related to the switch-on of the general relativistic engine responsible for the few percent of accreting black holes that drive powerful relativistic jets.

2. The Energetics of Launching the Most Powerful Jets in Quasars: A Study of 3C 82

Abstract:
3C□82□at□a□redshift□of□2.87□is□the□most□distant□3C□(Third□Cambridge□Catalogue)□quasar.□Thus,□it□is□a□strong□candidate□to□have□the□most-luminous□radio□lobes□in□the□universe.□3C□82□belongs□to□the□class□of□compact□steep-spectrum□radio□sources.□We□use□single-dish□and□interferometric□radio□observations□in□order□to□model□the□plasma□state□of□these□powerful□radio□lobes.□It□is□estimated□that□the□long-term□time-averaged□jet□power□required□to□fill□these□lobes□with□leptonic□plasma□is□$\bar{Q} \approx 2.66 \pm 1.33 \times 10^{47}\,\mathrm{erg\,s^{-1}}$,□among□the□largest□time-averaged□jet□powers□from□a□quasar.□Positing□protonic□lobes□is□not□tenable□as□they□would□require□two□orders□of□magnitude□more□mass□transport□to□the□lobes□than□was□accreted□to□the□central□black□hole□during□their□formation.□The□first□high□signal-to-noise□optical□spectroscopic□observation□obtained□of□this□object□indicates□that□there□is□a□powerful□high-ionization□broad-line□wind□with□a□kinetic□power□of□˜10^{45}□erg□s^{-1}□and□a□velocity□of□˜$0.01c$.□We□also□estimate□from□the□broad□lines□in□2018□and□the□UV□continuum□in□three□epochs□spread□out□over□three□decades□that□the□accretion□flow□bolometric□luminosity□is□L_{bol}□≈□3.2□5.8□□10^{46}□erg□s^{-1}.□The□ratio□of□$\bar{Q}/L_{\mathrm{bol}} \approx 5.91 \pm 3.41$ is□perhaps□the□largest□of□any□known□quasar.□Extremely□powerful□jets□tend□to□strongly□suppress□powerful□winds□of□ionized□baryonic□matter.□Consequently,□3C□82□provides□a□unique□laboratory□for□studying□the□dynamical□limits□of□the□central□engine□of□outflow□initiation□in□quasars.

3. **The Extreme Red Excess in Blazar Ultraviolet Broad Emission Lines**

ABSTRACT:

We present a study of quasars with very redward asymmetric (RA) ultraviolet (UV) broad emission lines (BELs). An excess of redshifted emission has been previously shown to occur in the BELs of radio-loud quasars and is most extreme in certain blazars. Paradoxically, blazars are objects that are characterized by a highly relativistic blueshifted outflow toward Earth. We show that the red emitting gas resides in a very broad component (VBC) that is typical of Population B quasars that are defined by a wide Hβ BEL profile. Empirically, we find that RA BEL blazars have both low Eddington rates ($\lesssim$1%) and an inordinately large (order unity) ratio of long-term time-averaged jet power to accretion luminosity. The latter circumstance has been previously shown to be associated with a depressed extreme UV ionizing continuum. Both properties conspire to produce a low flux of ionizing photons, two orders of magnitude less than typical Population B quasars. We use CLOUDY models to demonstrate that a weak ionizing flux is required for gas near the central black hole to be optimally ionized to radiate BELs with high efficiency (most quasars overionize nearby gas, resulting in low radiative efficiency). The large gravitational redshift and transverse Doppler shift result in a VBC that is redshifted by ~2000–5000 km s^{-1} with a correspondingly large line width. The RA BELs result from an enhanced efficiency (relative to typical Population B quasars) to produce a luminous, redshifted VBC near the central black hole.

II Conferences and educational activities

N/A

III. Service activities N/A

IV. Other

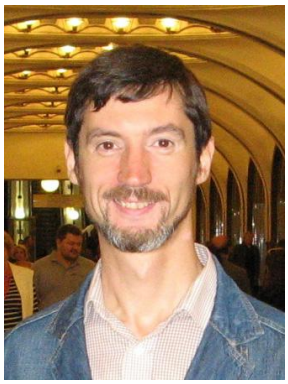
2019List of Publication

2019 List of Publication

Punsly, Brian; Hill, Gary J.; Marziani, Paola; Kharb, Preeti; Berton, Marco; Crepaldi, Luca; Indahl, Briana L.; Zeimann, Greg, “The Energetics of Launching the Most Powerful Jets in Quasars: A Study of 3C 82”, 2020 ApJ 189 169

Punsly, B., Paola Marziani, Marco Berton, Preeti Kharb, “The Extreme Red Excess in Blazar Ultraviolet Broad Emission Lines”,2020 ApJ 903 44

Surname Name **Photo**



Vereshchagin Gregory

Position: professor
Period covered: 2020

I Scientific Work

Scientific work is focused on the following aspects:

- Numerical scheme for evaluating the collision integrals for triple interactions in relativistic plasma (with I.A. Siutsou and M.A. Prakapenia)

Binary interactions in relativistic plasma, such as Coulomb and Compton scattering as well as pair creation and annihilation are well known and studied in detail. Triple interactions, namely, relativistic bremsstrahlung, double Compton scattering, radiative pair production, and triple pair production and their inverse processes, are usually considered as emission processes in astrophysical problems, as well as in laboratory plasmas. Their role in plasma kinetics is fundamental [A. G. Aksenov et al., Phys. Rev. Lett. 99, 125003 (2007)]. We present a new conservative scheme for computation of the Uehling–Uhlenbeck collision integral for all triple interactions in relativistic plasma based on direct integration of exact QED matrix elements. Reaction rates for thermal distributions are compared, where possible, with the corresponding analytic expressions, showing good agreement. Our results are relevant for quantitative description of relativistic plasmas out of equilibrium, both under astrophysical and laboratory conditions.

- Pauli blocking effects in thermalization of relativistic plasma (with M.O. Prakapenia)

We investigate the effects of Pauli blocking on thermalization process of relativistic plasma by solving relativistic Uehling-Uhlenbeck equations with QED collision integral for all binary and triple processes. With this purpose we consider nonequilibrium initial state of plasma to be strongly degenerate. We found that when electron-positron annihilation is efficient, initial plasma degeneracy is quickly destroyed. As a result in a wide range of final temperatures ranging from nonrelativistic to mildly relativistic $0.1\ m_e c^2 \leq k_B T \leq 10\ m_e c^2$ thermalization is not affected by Pauli blocking. Conversely, when electron-positron annihilation process is inefficient, thermalization process in such degenerate plasma is strongly affected by Pauli blocking. This is possible either in a

nonrelativistic plasma, with equilibrium temperature $k_B T \leq 0.3\ m_e c^2$, or in photon-electron plasma. In these cases all reaction rates are strongly suppressed by Pauli blocking and thermalization does not occur until electrons can populate energy states above the Fermi energy. Soon after this happens thermalization proceeds suddenly in an avalanche-like process. Such rapid thermalization can be a unique footprint of strongly degenerate plasma.

- Diffusive photospheres in gamma-ray bursts (with I. A. Siutsou)

Photospheric emission may originate from relativistic outflows in two qualitatively different regimes: last scattering of photons inside the outflow at the photospheric radius or radiative diffusion to the boundary of the outflow. In this work, the measurement of temperature and flux of the thermal component in the early afterglows of several gamma-ray bursts along with the total flux in the prompt phase is used to determine initial radii of the outflow as well as its Lorentz factors. Results indicate that in some cases the outflow has relatively low Lorentz factors ($\Gamma<10$), favouring cocoon interpretation, while in other cases Lorentz factors are larger ($\Gamma>10$), indicating diffusive photospheric origin of the thermal component, associated with an ultrarelativistic outflow.

- Bose-Einstein condensation in relativistic plasma (with M. A. Prakapenia)

The phenomenon of Bose-Einstein condensation is traditionally associated with and experimentally verified at low temperatures: either of the nano-Kelvin scale for alkali atoms, or room temperatures for quasi-particles or photons in two dimensions. Here we demonstrate out of first principles that for certain initial conditions nonequilibrium plasma at relativistic temperatures of billions of Kelvin undergoes condensation, as predicted by Zeldovich and Levich in their seminal work. We determine the necessary conditions for the onset of condensation and discuss the possibilities to observe such a phenomenon in laboratory and astrophysical conditions.

II Conferences and educational activities

II a Conferences and Other External Scientific Work

- Organization of the Fourth Zeldovich virtual meeting, with 146 participants, 90 talks, among them 31 invited: 7 – 11 September 2020; the meeting was originally scheduled for 20-24 April 2020, but due to COVID pandemic it was first postponed to September, and then converted into virtual format;

- talk “Diffusive photospheres and thermal emission in early afterglows of gamma-ray bursts”, 14th International Conference on Gravitation, Astrophysics and Cosmology, virtual meeting, August 17 – 21;

- talk "On Bose-condensation of photons in relativistic plasma", The Forth Zeldovich virtual meeting, 7 – 11 September 2020.

II b Work With Students

- Mikalai Prakapenia, IRAP-PhD student, National Academy of Sciences of Belarus

II c Diploma thesis supervision

II d Other Teaching Duties

II e. Work With Postdocs

- Ivan Siutsou: relativistic plasma thermalization with quantum degeneracy; photospheric emission

- Stanislav Komarov: The motion and radiation of a test charged particle in the vicinity of a black hole

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 the Fourth Zeldovich Meeting

- editing of the Fourth Zeldovich Meeting proceedings

- 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 Belarusian state program “Convergence-2020”, subprogram “Microworld and Universe”;

- Co-PI of the joint ICRANet-BRFFR research program “Relaxation of multicomponent optically thick relativistic plasma with quantum degeneracy” for 2019-2021.

IV. Other

- Public lecture “Nobel prize in Physics 2020: laureates and their results” at the virtual meeting of the Belarusian Physical Society, 23 October 2020;
- "Nobel per la Fisica 2020", lecture at the event Notte dei Ricercatori 2020, ICRANet online meeting, 27 November 2020.

2020 List of Publication

1. M. A. Prakapenia, I. A. Siutsou and G. V. Vereshchagin, “Numerical scheme for evaluating the collision integrals for triple interactions in relativistic plasma”, Phys. Plasmas 27, 113302 (2020) pp. 1-10.
2. M. A. Prakapenia and G. V. Vereshchagin, “Pauli blocking effects in thermalization of relativistic plasma”, Phys. Lett. A, Vol. 384 (2020) 126679.
3. G. V. Vereshchagin and I. A. Siutsou, “Diffusive photospheres in gamma-ray bursts”, MNRAS 494 (2020), pp. 1463-1469.
4. M. A. Prakapenia and G. V. Vereshchagin, “Bose-Einstein condensation in relativistic plasma”, EPL 128 (2019) 50002 (Published on 30 of January 2020).

Surname Name **Xue She-Sheng** **Photo**

Position: ICRANet Faculty

Period covered: 2019 -- 2020

I Scientific Work

Kerr black hole in an external magnetic field, and strongly pulsating electromagnetic field in gravitational collapse and heavy atoms, as well as their relevance to Gamma-Ray Bursts (GRBs) 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, 2019, Pescara, Italy) and the first Hangzhou meeting on Gravitational waves (October, 2019).
Participating the preparation of ICRANet agreements with Institutions of China (2018-2020).

Participating the preparation of ICRANet outreach activities: ICRANet exhibitions in Pescara and Rome, la Notte Europea dei Ricercatori 2018-2019 and Besso foundation.

(II b) Work With Students and young researchers

Stefanon, Campion, Wang Yu, Rahim Moradi, Li Liang and Luis Gabriel Gómez Díaz, David Melon Fuksman, Yu Ling Chang, Maryam Amiri, B. Elsan, Panah and Rashid Riahi, Seddigheh Tizchang, Somayye Mahmoudi, as well as Takahiro Hayashinaka, Cheng-Jun Xia (supported by their nations).

(II c) Diploma thesis supervision (2012-2020)

Stefanon, Campion, Yuanbin Wu, Handrik Ludwig, Eckhard Strobel, and Clement Stahl (all are Erasmus Mundus Ph.D. students), their main publications: 12 in Phys. Rev. , and 6 in Nucl. Phys., Phys. Lett.

(II d) Other Teaching Duties (2012-2020)

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 (2012-2020)

R. Ruffini, H. Kleinert, G. Vereshchagin, J. Rueda, C. Bianco, W.B. Han, I. Siutsou, C. Argulles, C. Gruber, M. Zarei, M. Abdi, R. Mohammadi, D. Bégué, E. Bavarsad and Sang Pyo Kim, S. Shakeri, F. Hajkarim, F. Romeo, O. Panella, R. Leonardi, S. Hao. A. Gurrola, M. Haghighat, David J. E. Marsh, C.-J. Xia, R.-X. Xu, S.-G. Zhou, D. Gregoris, T. Adormo

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 IHE, ITP, and USTC CAS as well as Tsinghua University, Sun Yet-San University and Hang Zhou University of technology that are in cooperation with ICRANet .

IV. Other

The List of Publications (2019 -- 2020)

R. Ruffini, et. al. ``On the GeV emission of the type I BdHN GRB 130427A '', ApJ 886, No. 2, 2019, https://arxiv.org/abs/1812.00354

R. Ruffini, et.al. `` Self-similarity and power-laws in GRB 190114C '', arXiv:1904.04162 and ``Self-Similarities and Power-laws in the Time-resolved Spectra of GRB 190114C, GRB 130427A, GRB 160509A, and GRB 160625B'' arXiv:1910.12615; `` On the role of the Kerr-Newman black hole in the GeV emission of long gamma-ray bursts '' arXiv:1803.05476.

S. Tizchang, R. Mohammadi and S.-S. Xue, `` Probing Lorentz violation effects via a laser beam interacting with a high-energy charged lepton beam.'' Eur. Phys. J. C (2019) 79: 224 https://arxiv.org/abs/1811.00486.

M. Haghighat, S. Mahmoudi, R.Mohammadi, S. Tizchang and S.S. Xue,`` Circular polarization of cosmic photons due to their interactions with Sterile neutrino dark matter'', Phys. Rev. D 101, 123016 (2020) https://arxiv.org/abs/1909.03883

M. Abdi, R. Mohammadi, S.-S. Xue, M. Zarei , ``Distinguishing Dirac from Majorana neutrinos in a microwave cavity'', https://arxiv.org/abs/1909.01536

D. Bégué, C. Stahl and S.-S. Xue, ``A model of interacting dark fluids tested with supernovae and Baryon Acoustic Oscillations data'', Nuclear Physics, Section B, Volume 940, p. 312-320, (2019), https://arxiv.org/abs/1702.03185

R. Leonardi, O. Panella, F. Romeo, A. Gurrola, H. Sun, S.-S. Xue "Phenomenology at the LHC of composite particles from strongly interacting Standard Model fermions via four-fermion operators of NJL type ", The European Physical Journal C volume 80, Article number: 309 (2020), https://arxiv.org/abs/1810.11420

E. Bavarsad, S. P. Kim, C. Stahl, S.-S. Xue, ``QED effective action in de Sitter space'', in preparation, will appear soon in arXiv and regular scientific journal.

S.-S. Xue "Cosmological constant, matter, cosmic inflation and coincidence", Modern Physics Letters A, (2020) 2050123 https://arxiv.org/abs/2004.10859

S.-S. Xue, `` Cosmological Lambda driven inflation and produced particles '', https://arxiv.org/abs/1910.03938.

S.-S. Xue "Cosmological Lambda converts to reheating energy and cold dark matter ", https://arxiv.org/abs/2006.15622

S.-S. Xue "Horizon crossing causes baryogenesis, magnetogenesis and dark-matter acoustic wave ", https://arxiv.org/abs/2007.03464

S. Shakeri, David J. E. Marsh, and S.-S. Xue
`` Light by Light Scattering as a Probe for Axion Dark Matter'',
https://arxiv.org/abs/2002.06123

S. Shakeri, F. Hajkarim, S.-S. Xue "Shedding New Light
on Sterile Neutrinos from XENON1T Experiment ", to be published in JHEP
(2021), https://arxiv.org/abs/2008.05029

C.-J. Xia, S.-S. Xue, R.-X. Xu, S.-G. Zhou "Supercritically
charged objects and electron-positron pair creation ", Phys. Rev. D 101, 103031
(2020), https://arxiv.org/abs/2001.03531

S.-S. Xue "Spontaneous Peccei-Quinn symmetry breaking renders sterile
neutrino, axion and χboson to be candidates for dark matter particles ",
https://arxiv.org/abs/2012.04648

S. Campion, J. A. Rueda, S. S. Xue, R. Ruffini "Magnetic field screening process
in a Kerr Black Hole ", 11681 This work has
been already presented at the 30th Texas Symposium Meeting on Relativistic
Astrophysics held in "Portsmouth" in December 2019 and at the SIF National
Congress held in "L'Aquila" in September 2019, Astronomy Reports, 2021, Vol. 98,
No. 1, https://arxiv.org/abs/2002.11681

Adjunct Professors of the Faculty

ARGÜELLES Carlos Raúl

Position: ICRANet collaborator
Researcher staff - CONICET (Argentina)
Assistant Professor - La Plata National University (Argentina)

Period covered: December 2019 – December 2020

I Scientific Work

Research on Dark Matter (theory, phenomenology, model building), self-gravitating systems, Galactic Dynamics, Cosmology: scale structure formation, Neutrino Physics beyond standard model, General Relativity (numerical relativity), extensions to GR.

II Conferences and educational activities

II a Conferences and Other External Scientific Work

- Invited speaker at The Fourth Zeldovich virtual meeting, September 7-11, 2020.

- Invited speaker (online) at the Astronomy Department seminars at IAG USP, September 16, 2020.

II b Work With Students

Master in ScienceThesis supervisor of two graduate students: Valentina Crespi and Santiago Collazo(at Facultad de Cs. Astronómicas y Geofísicas - UNLP). Area: Astrophysics.

II c Diploma thesis supervision

Ph.D. Advisor

- Ph.D. Student: Rafael I. Yunis. Institution: IRAP-PhD (16th cycle) at Sapienza Università di Roma & ICRANet (Joint doctorate program). Pheriod covered: (2018-present)

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

Scientific collaborator in the area of “self-gravitating systems of dark matter particles”

III b. Outside ICRANet

Assistant Professor at La Plata National University (Theoretical Physics)

IV. Other

2020 List of Publication

[1] ARGUELLES C. R.; DIAZ M.; KRUT A.; YUNIS R.; On the formation and stability of fermionic dark matter halos in a cosmological framework. MNRAS **2020** doi: 10.1093/mnras/staa3986

[2] YUNIS R.; ARGUELLES C. R.; LOPEZ-NACIR D.; Boltzmann hierarchies for self-interacting warm dark matter scenarios. JCAP, i. 9 (id. 041) **2020** doi: 10.1088/1475-7516/2020/09/041

[3] YUNIS R.; ARGUELLES C. R.; MAVROMATOS N.E.; MOLINÉ A.; KRUT A.; CARINCI M.; RUEDA J.A.; RUFFINI R.; Galactic center constraints on self-interacting sterile neutrinos from fermionic dark matter ("ino") models. Physics of the Dark Universe, v. 30 (id. 100699) **2020** doi: 10.1016/j.dark.2020.100699

[4] BECERRA-VERGARA, E. A.; ARGUELLES, C. R.; KRUT, A.; RUEDA, J. A.; RUFFINI, R.. Geodesic motion of S2 and G2 as a test of the fermionic dark matter nature of our Galactic core. A&A, v. 641, p. 14, **2020** doi:10.1051/0004-6361/201935990

[4] PENACCHIONI, A.V.; CIVITARESE, O.; ARGUELLES C. R.; Testing dark matter distributions by neutrino-dark matter interactions. EUROPEAN PHYSICAL JOURNAL C – v. 80 (n. 3)**2020** doi:10.1140/epjc/s10052-020-7744-x

Bini Donato

Position: Current
Research Director (permanent position) at
Istituto per le Applicazioni del Calcolo "M. Picone," CNR
Via dei Taurini, 19 I-00185 Roma (IT).

I Scientific Work

The main topic of my interest is General Relativity with special attention to several classical aspects.

In particular, I'm interested in: analysis and interpretation of exact solutions of Einstein's field equations, 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. From 2016 I'm attending the Capra Meetings of the gravitational self-force community and as well as all meeting involving Post-Newtonian approximation, Post-Minkowskian approximation, Effective Field Theory and Effective One-Body approach.

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), year 2016.

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. I've been teaching monographic courses at various Ph.D. schools in Italy.

Work with associate researchers
A Geralico (Istituto per le Applicazioni del Calcolo "M. Picone," CNR, Rome, Italy)

III Service activities
Scientific collaboration with:
Prof. R.T. Jantzen (Villanova Univesity, USA and ICRANet);

Outside ICRANet
Scientific collaboration with:
Prof. T. Damour (IHES, Paris, France).
Dr. G. Esposito (INFN, Napoli, 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 2017, 2018 and 2019 I've been awarded as **Outstanding Referee** from the journal Classical and Quantum Gravity (IOP).
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*

2020 List of publications

1) Bini D. Damour T. and Geralico A.
Scattering of tidally interacting bodies in post-Minkowskian gravity,
Phys. Rev. D **101**, no. 4, 044039 (2020)
DOI:10.1103/PhysRevD.101.044039
e-Print: arXiv:2001.00352 [gr-qc].

2) Bini D., Geralico A. Jantzen R. T., Plastino W.,
Godel spacetime, planar geodesics and the Mobius map
Gen Relativ Gravit **52**, 73 (2020)
doi: doi.org/10.1007/s10714-020-02731-w
e-print: arXiv:2002.11432 [gr-qc].

3) Rettegno P., Martinetti F., Nagar A., Bini D., Riemenschneider G., and Damour T.
Comparing effective One Body Hamiltonians for spin-aligned coalescing binaries
Physical Review D , **101**, No. 10 (2020)
DOI: 10.1103/PhysRevD.101.104027
e-Print: arXiv:1911.10818 [gr-qc].

4) Bini D. and Esposito G.,
New solutions of the Ermakov-Pinney equation in curved spacetime
General Relativity and Gravitation, **52**, No. 60, 2020
doi: 10.1007/s10714-020-02713-y
e-Print: arXiv:1912.01869 [gr-qc].

5) Bini D., Geralico A. and Steinhoff J.,
Detweiler's redshift invariant for extended bodies orbiting a Schwarzschild black hole
Phys. Rev. D, **102**, 024091, (2020)
doi: 10.1103/PhysRevD.102.024091
e-print: arXiv:2003.12887 [gr-qc].

6) Bini D., Damour T. and Geralico A.,
Binary dynamics at the fifth and fifth-and-a-half post-Newtonian orders
Phys. Rev.D, **102**, 024062 (2020)
e-print: arXiv:2003.11891 [gr-qc].

DOI: 10.1103/PhysRevD.102.024062
Appeared as Editor Suggestion paper

7) Bini D., Damour T. and Geralico A.
Sixth Post-Newtonian local-in-time dynamics of binary systems
Phys. Rev. D, **102**, 024061 (2020)
e-print: arXiv:2004.05407 [gr-qc].
DOI: 10.1103/PhysRevD.102.024061
Appeared as Editor Suggestion paper

8) Bini D., Damour T. and Geralico A.
Sixth post-Newtonian nonlocal-in-time dynamics of binary systems
Phys. Rev. D, **102**, no.8, 084047 (2020)
e-print: arXiv:2007.11239 [gr-qc, hep-th].
DOI: 10.1103/PhysRevD.102.084047

9) Salucci P, et al.,
When Planck, Einstein and Vera Rubin Meet. Dark Matter: What is it? Where is it?
Frontiers in Astronomy and Space Sciences, to appear 2020
[White Paper of the INFN collaboration QGSKY]
arXiv:2011.09278

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
Member of Euclid and 4MOST
PI: ERC advanced Grant ARThUs

Period covered: January 2020 - December 2020

I Scientific Work

(i) Generalization of scalar averaging schemes for arbitrary 3+1 foliations of space-time and arbitrary fluid content. Covariant formulation of the averaging scheme and relations to topology.
(ii) Dark Energy-free fit to supernova data and explanation of the Hubble tension.
(iii) Comparison of Lagrangian perturbation schemes with exact solutions in GR.

II Conferences and educational activities

II a Conferences and Other External Scientific Work
- SOC : Workshop "Emerging Issues in Cosmology and Particle Physics", Visva Bharati, India (January 2020).
- Seminar : Institut des Mathématiques Camille-Jordan, Lyon, France (January 2020).

II b Work With Students
3 PhD students (ongoing) :
Quentin Vigneron, Martin France and Étienne Jaupart.
II c Diploma thesis supervision:
2 Master students M1 (Matthieu Chatelain, ENS and Nathan Cohen, ENS-EPFL Lausanne) ;
II d Other Teaching Duties see below.
II e. Work With Postdocs :
Collaboration with Pratyush Pranav, Léo Brunswic, Nezihe Uzun, Asta Heinesen, ERC postdocs, financed by the ERC advanced Grant "ARTHUS, PI: T. Buchert". Collaboration with Jan. J. Ostrowski (Warsaw), Ismael Delgado Gaspar (Mexico).

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.
Exercises in "Introduction to General Relativity", École Normale Supérieure, Lyon.
Exercises in “Fluidmechanics”, Université Lyon 1.
Tutorials for future teachers at École Normale Supérieure, Lyon.

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

2020 List of Publications

peer-reviewed – published and accepted

ad (i) - Buchert T., Mourier P., Roy X. : 'On Average Properties of Inhomogeneous Fluids in General Relativity III: General Fluid Cosmologies', Gen. Rel. Grav. 52, 27 (2020).

ad (i) - Brunswic L., Buchert T. : 'Gauss-Bonnet-Chern approach to the averaged Universe', Class. Quant. Grav. 37, 215022 (2020).

ad (ii) - Heinesen A., Buchert T. : 'Solving the curvature and Hubble parameter inconsistencies through structure formation-induced curvature', Class. Quant. Grav. 37, 164001 (2020).

ad (iii) – Delgado Gaspar I., Buchert T.: 'Lagrangian theory of structure formation in relativistic cosmology. VI. Comparison with Szekeres exact solutions', Phys. Rev. D, accepted (2020).

Fisher Robert

Position: **Associate Professor** in Physics
Graduate Program Director
University of Massachusetts Dartmouth
285 Old Westport Road
North Dartmouth, Ma. 02740
Tel. +1-508-999-8353
Email: robert.fisher@umassd.edu

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

Period covered: 2020

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

AAS 236, "Constraining the Progenitors and Mechanisms of Type Ia Supernovae Through Late-Time Light Curve Observations," 6/20

TAPIR Seminar, Caltech, "Type Ia Supernovae Progenitors," 3/13/2020

UCSC FLASH Seminar, "Type Ia Supernovae Progenitors," 3/6/2020

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 6 graduate students and 6 undergraduate students
- Graduate program director
- Instructor for classical physics, statistical mechanics, modern physics, and astrophysics courses

IV. Other

2020 List of Publication

Y. Zenati, **R. Fisher**, "Universality and Non-Universality in Distributed Nuclear Burning in Homogeneous Isotropic Turbulence," 2020. arXiv

O. Graur, K. Maguire, R. Ryan, M. Nicholl, A. Avelino, A. G. Riess, L. Shingles, I. Seitenzahl, **R. Fisher**, "A year-long plateau in the late-time near-infrared light curves of Type Ia supernovae," Nature Astronomy, 2020. ADS arXiv DOI

Surname Name **Photo** 

Quevedo Hernando

Position: Full Professor - National Autonomous University of Mexico
Period covered: 2020

I Scientific Work

II Conferences and educational activities

II a Teaching duties
Course: Geometrothermodynamics (graduate) January-June 2020
Course: Theoretical cosmology (undergraduate) February – June 2020
II a Conferences and Other External Scientific Work

II b Work With Students

II c Diploma thesis supervision
- Pedro Sánchez (PhD)
  Topic: Geometrothermodynamics in relativistic astrophysics
- Juan José Vega (PhD)
  Topic: Topological quantization of mechanical systems
- Servando Vargas (PhD)
  Topic: Mathematical structure of quadrupolar spacetimes
- Luis Miguel Sánchez (PhD)
Topic:Inducedgravity
- Luis FernandoAragón (PhD)
Topic:Simplectic geometrothermodynamics
- Moisés E. Jiménez (MSc)
Topic:Fiberquantization
- Brandon A. Hernández (MSc)
  Topic: Black shells

II d Other Teaching Duties

II e. Work With Postdocs
- Francisco L. Escamilla, UNAM
- Daniel F. Higuita, UNAM

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

2020 List of Publications

"Singularity theorems in Schwarzschild spacetimes" (Servando V. Serdio and Hernando Quevedo) *European Physical Journal Plus,* 135*:636* (2020).

Abstract

We study the conceptual details and the physical interpretation of the two prominent singularity theorems due to Penrose and Hawking. Their usage is discussed in detail for the Schwarzschild spacetime with positive and negative mass. First, we present a detailed mathematical proof to formally guarantee the existence of a singularity of geodesic incompleteness for the case of positive mass. Second, we discuss the applicability of the mathematical tools used by the theorems in the negative mass case. The physical implications of the validity or inconsistency of the hypotheses of such theorems on the latter case are also exhibited. As far as this analysis is concerned, some clues are produced regarding future research that could result in general properties for naked singularities.

"Repulsive regions in Lemaître–Tolman–Bondi gravitational collapse" (Roberto Giambò, Orlando Luongo, Hernando Quevedo), Physics of the Dark Universe, 30:100721 (2020)

Abstract

We show that in the inhomogeneous Lemaitre-Tolman-Bondi space-time there are specific regions in which repulsive gravity exists. To find these regions, we use an invariant definition of repulsive gravity based upon the behavior of the curvature eigenvalues. In addition, we analyze the effects of repulsive gravity on the dynamics of the gravitational collapse. In particular, we investigate the collapse in the case of the parabolic solution for the effective scale factor of the Lemaitre-Tolman-Bondi metric, corresponding to the marginally bound case. Exploring the corresponding cut-offs at which gravity becomes repulsive, we notice that black holes with dominant repulsive effects are not excluded a priori. Indeed, we demonstrate that the collapse leads, in general, to the formation of a central naked singularity; however, for particular values of the free parameters entering the model, black holes with dominant repulsive gravity can exist. We show that the expected physical process is not modified as the marginally bound condition is dropped out. Moreover, we show that this is true independently of the hypothesis that the energy-momentum tensor is built up in terms of pressureless matter. Further, we demonstrate that geodesic deviations can depend on the sign of the curvature eigenvalues. Finally, we give an astrophysical interpretation of black holes with dominant repulsive gravity. Indeed, we argue that compact objects with dominant repulsive gravity could be interpreted as progenitors of Gamma Ray Bursts.

"Modeling reparametrizations in thermodynamic phase space" (V. Pineda-Reyes, L. F. Escamilla-Herrera, C. Gruber, F. Nettel and H. Quevedo) *Physica A: Statistical Mechanics and its Applications* 563:125464 2020).

Abstract

We investigate the consequences of reparametrizations in the geometric description of thermo- dynamics analyzing the effects on the thermodynamic phase space. It is known that the contact and Riemannian structures of the thermodynamic phase space are related to thermodynamic equi- librium and statistical

fluctuations in the Boltzmann-Gibbs statistical mechanics. The physical motivation for this analysis rests upon the possibility of having, instead of a direct control of the intensive parameters determining the state of the corresponding physical reservoirs, the control of a set of differentiable functions of the original variables. Likewise, we consider a set of differentiable functions of the extensive variables accounting for the possibility of not having direct access to the original variables. We find that different geometric structures in the thermodynamic phase space can be used to describe its contact and Riemannian structures, while preserving the metric structure on the thermodynamic space of equilibrium states, if we restrict ourselves to a particular set of reparametrizations. We also single out a rank-two tensor that geometrically comprises the information about such reparametrizations in the thermodynamic phase space.

"Geometrothermodynamics of Black Hole Binary Systems" (Hernando Quevedo, María N. Quevedo and Alberto Sánchez) *International Journal of Modern Physics D* 29:2050053 (2020).

Abstract

We study a stationary and axisymmetric binary system composed of two identical Kerr black holes, whose physical parameters satisfy the Smarr thermodynamic formula. Then, we use the formalism of geometrothermodynamics to show that the spatial distance between the black holes must be considered as a thermodynamic variable. We investigate the main thermodynamic properties of the system by using the contact structure of the phase space, which generates the first law of thermodynamics and the equilibrium conditions. The phase transition structure of the system is investigated through the curvature singularities of the equilibrium space. It is shown that the thermodynamic and stability properties and the phase transition structure of the binary system strongly depend on the distance between the black holes.

Sigismondi Costantino Photo

Position: Professor

Period covered: 17/01/2020-10/01/2021

I Scientific Work

Calibration of the meridian line of S. Maria degli Angeli , Study of atmospheric refraction at the horizon in Ostia, Visual magnitude measurements of Betelgeuse, Antares and Delta Scorpii

II Conferences and educational activities

II a Conferences and Other External Scientific Work

6 Conferenze ISPRA Microsoft Word - 1a circolare.doc (isprambiente.gov.it) either in presence/online
6 Meeting ICRANet (see next session) 1 in presence, 2 podcast, 3 online
4 ASYAGO online schools (next session)
3 Solstice and Equinox confereces 21 June, 22 September and 21 December 2020 S. Maria degli Angeli
106° SIF Meeting September 2020 Milano, online on Betelgeuse deep minimum
Liceo Galilei, Pescara, *Lo storico Minimo di Betelgeuse,* Science by Night 18 January 2020
Società Geografica Italiana, Roma, 22 January 2020, *The (Hypogean) Meridian Line of Augustus*
Società Geografica Italiana, Roma, 5 March 2020, *The tsunamis in the Adriatic sea*
Ateneo Pontificio Regina Apostolorum, 2 March 2020, *Collegio Romano, Science and Faith* 13 October 2020 *Egnazio Danti O.P. Cosmografo e Vescovo*
ISPRA *Antichissime osservazioni astronomiche di Betelgeuse tra mito e tradizione sulla variabilità stellare.* 28 October 2020
ISPRA *Terra tremuit et quievit: i terremoti e la Madonna del Ponte a Lanciano-*
Anatolè ex ypsus: la Stella dei Magi tra arte, storia e scienza 28 November 2020

II b Work With Students

Basic Physics for seven classes of Technical Industrial Institute Galileo Ferraris of Rome (full time work) until present
Advanced Physics (Terrestrial Physics and Astrophysics) ITIS Galileo Ferraris PON 2014-2020 (ID 10.2.2A-FDRPOC-LA-2019-8) until 29 January 2020

II c Diploma thesis supervision

Thesis of Giorgio Rossi on Tycho Brahe at the Master Science and Faith, Pontifical Atheneum Regina Apostolorum, Roma.

Thesis of Paolo Bettongagli on Giuseppe Piazzi at the Master Science and Faith, Pontifical Atheneum Regina Apostolorum, Roma.

II d Other Teaching Duties

Alternanza Scuola Lavoro with three classes of Galileo Galilei Lyceum of Pescara

Conferences of History of Astronomy at the Pontifical Atheneum Regina Apostolorum, Rome AA 2019-2020

Course of Laboratory of Astrophysics at Sapienza University 23 January 2020-present

ASYAGO 2020 Asiago School for Young Astronomers with Galileo Observations: 4 editions with UNIPD

Summer August 3-7 and 10-14 2020.

Winter December 28-30 2020 and January 3-5 2021

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

Organization and chair of the International Meetings

I.C.R.A. Network - Betelgeuse dimming 17 Jan 2020

I.C.R.A. Network - Gerbertus 2020 7 May 2020

I.C.R.A. Network - Dante e l'Astronomia (Scienza) 13 Sep 2020

I.C.R.A. Network - La Notte dei Ricercatori 2020 20 Nov 2020

I.C.R.A. Network - L'eclissi di Sole e la misura del diametro solare 14 Dec 2020

I.C.R.A. Network - Congiunzione e Solstizio tra Storia e Meccanica Celeste 21 Dec 2020

Alternanza Scuola Lavoro with Galileo Galilei Lyceum in Pescara; conferences of January 17, 18 and 19 2020 (the night of science).

III b. Outside ICRANet

Alternanza Scuola Lavoro with Galileo Galilei Lyceum in Pescara;
Laboratory of Solar Physics Sapienza University of Rome with prof. Paolo De Bernardis
Conferences held at the Pontifical Atheneum Regina Apostolorum, Rome
https://www.upra.org/approfondimenti/abstract-conferenza-master-scienza-e-fede-il-collegio-romano-e-il-rapporto-scienza-religione/ 2 march 2020

https://www.upra.org/approfondimenti/abstract-conferenza-master-scienza-e-fede-padre-egnazio-danti-o-p-cosmografo-e-vescovo/ 13 october 2020

IV. Other

Photometric observations of Betelgeuse, alf Ori, a series of 730 data from Jan 1, 2012. First Identification of its raise after the historical minimum in February 2020 http://www.astronomerstelegram.org/?read=13601 *and of its secondary minimum in August 2020:* http://www.astronomerstelegram.org/?read=13982

Referee for Gerbertus journal.

2020 List of Publications

Three volumes (11, 12 and 13) of Gerbertus have been assembled in 2020, and published either in NASA ADS sigismondi, c. - NASA/ADS (harvard.edu) they contain **53** new papers of C. Sigismondi, beyond other authors.

Volume 11 dedicated to Cypress phenology and pollens dynamics

Volume 12 to S. Maria degli Angeli meridian line achievements, Lunar eclipses and Geodesics

Volume 13 to Betelgeuse deep minimum of 2020

These numbers can be downloaded as full volumes from the ICRA website www.icra.it/gerbertus

Mem. Descr. Carta Geol. d'It. 107 (2020), pp. 211-216 Dai sedimenti dei laghi ai transiti di Mercurio sul Sole: dati per una storia del clima tra preistoria e storia moderna

Mem. Descr. Carta Geol. d'It. 107 (2020), pp. 421-424 La meridiana di Augusto al Campo Marzio da Plinio Seniore ai giorni nostri

Mem. Descr. Carta Geol. d'It. 107 (2020), pp. 493-498 Maremoto, disastro e punto di stella sulla costa abruzzese

Mem. Descr. Carta Geol. d'It. 106 (2020), pp. 45-50 Il Palatino, l'Astronomia, il culto della dea Pales, Palilicium (Aldebaran) e l'origine di Roma

Video list of meridian transits in S. Maria degli Angeli, Rome, 2018-2020 web page ICRA
Video list of sea sunset at Ostia in 2019-2020 web page ICRA
218 items of Lezioni di Fisica including other meridian transits and sunsets at the ICRA-based google drive Lezioni di Fisica - Google Drive

Educational Youtube Channel https://www.youtube.com/channel/UCe18v3EZ8w2qmd8jW6mYV5w/videos

Yousef Sobouti

Position, Founder, Institute for Advanced Studies in Basic Sciences (IASBS), 1992

Founding President, IASBS, 1992 – 2010

Professor of Physics, Shiraz University, 1964 -1997, IASBS 1993 – 2020

Founder, Biruni Observatory of Shiraz University, 1971, Founding Director, 1971 – 1981

Founder and Founding Director, Center for Research in Climate Change and Global Warming, IASBS, 2012 - present

Fellow, The World Academy of Sciences (TWAS), 1987 – present

Fellow, Iran Academy of Sciences, 1988 – present

I Scientific Work

- **Education:**

  B.Sc., Physics, Tehran University, 1953

  M.A., Physics, University of Toronto, 1960

  Ph.D., Astronomy and Astrophysics, University of Chicago, 1963

- **Positions held**:

  Lecturer, Dept. of Math., University of Newcastle on Tyne, 1963-1964

  Associate Professor, Physics, Shiraz University, 1964-1970

  Visiting Associate Professor, Astronomy, University of Pennsylvania, 1968-1969

  Professor of Physics, Shiraz University, 1971 to 1999

  Chairman, Physics Department, Shiraz University, 1972-1974 and 1978-1980

  Visiting Senior Researcher, Astronomical Institute, University of Amsterdam, 1975-1976

  Visiting Scholar, Astronomy and Astrophysics Center, University of Chicago, 1984-1985

  Visiting Professor, Physics Department, Northeastern University, Boston, 1991-1992

  Professor of Physics, Institute for Advanced Studies in Basic Sciences (IASBS), Zanjan, Iran 1991- 2020

  Academy of Sciences of Iran, Basic Sciences Branch, Head, 2012 - 2019

  Adjunct Professor, International Center for Relativistic Astrophysics Network (ICRANET), Pescara, Italy, 2015

- **Publications (Papers)**

1. Sobouti, Y., “Massive Gravity as an Alternative Gravity” Gravitation and Cosmology, Vol. 26, Number 1, pp 1–6, (2020)

2. Sobouti, Y., “An Oscillator representation of elementary particles” J. Phys. Communication, Journal of Physics Communications, Volume 2, Number 8 (2018)2

3. Sobouti, Y., Lorentz Covariance `almost' implies electromagnetism and more, Eur. J. Phys. 17 180–2. IOPscience. 2015, arXiv:1507.06393 [physics.class-h]

4. Sobouti, Y., "Minimalist's Electromagnetism - Different Axioms and Different Insight", 1-4, (2013).

5. Sobouti, Y., "On the Mass and Evolutionary Status of the Bright Red AGB Supergiant α1 Herculis in Why Galaxies Care about AGB Stars II: Shining Examples and Common Inhabitants, Edited by F. Kerschbaum, T. Lebzelter, and R.F. Wing. San Francisco", Proceedings of a conference held at University Campus, Viena, Austria, 16-20 August 2010, Astronomical Society of the Pacific, 2011, 163-164, (2010).

6. Sobouti, Y., "Dark Companion of Baryonic Matter in Spiral Galaxies in DARK MATTER IN ASTROPHYSICS AND PARTICLE PHYSICS, Edited by Hans Volker Klapdor-Kleingrothaus, Irina V Krivosheina", Proceedings of the 7th International Heidelberg Conference on Dark 2009 . Held 18 - 24 January 2009 in Christchurch, New Zealand, Published by World Scientific Publishing Co. Pte. Ltd., 2010. ISBN: 9789814293792, 356-362, (2010).

7. Sobouti, Y., Hasani Zonoozi, A., Haghi, H., "Tully-Fisher relation, key to dark companion of baryonic matter ", Astron. & Astrophys. (A&A), 507: (2), 635-638, (2009).

8. Sobouti, Y., "Dark companion of Baryonic matter, III", , 1-4, (2009).

9. Sobouti, Y., "Revised Dynamics or Dark Matter in Galactic and Extra Galactic Scales?", A & A, (2008).

10. Sobouti, Y., "The Morality of Exact Sciences", Science and Technology and the Future Development of Societies: International Workshop Proceedings (2008) , 10-13, (2008).

11. Sobouti, Y., "Dark Companion of Baryonic Matter", arXiv:0810.2198v1 [gr-qc], 1-4, (2008).

12. Sobouti, Y., "Review of Cosmic Anger: Abdus Salam — the First Muslim Nobel Scientist", MAA Online (The Mathematical Association of America),Publisher: Oxford University Press, ISBN: 9780199208463, 1-305, (2008).

13. Sobouti, Y., "Dark companion of baryonic matter in spliral galaxies", arXiv:0812.4127, 1-3,

(2008).

14. Sobouti, Y., "a f(R) Gravitation for Galactic Environments in THE ELEVENTH MARCEL GROSSMANN MEETING On Recent Developments in Theoretical and Experimental General Relativity, Gravitation and Relativistic Field Theories, Edited by Hagen Kleinert, Robert T Jantzen", Proceedings of the MG11 Meeting on General Relativity . Held 23-29 July 2006 in Berlin, Germany, Published by World Scientific Publishing Co. Pte. Ltd., 2008. ISBN: 9789812834300, 1230-1232, (2008).

15. Sobouti, Y., "An f(R) Gravitation for Galactic Environments", Astron. & Astrophys. (A&A), 464: (3), 921-925, (2007).

16. Sobouti, Y., "Astronomy in Iran", Proceedings of the International Astronomical Union 2(SPS5), August 2007, 147-148, (2007).

17. Sobouti, Y., "An f(R) Gravitation for Galactic Environments", Galaxy Evolution Across the Hubble Time, Edited by F. Combes and J. Palous, Proceedings of the International Astronomical Union 2, IAU Symposium No.235, held 14-17 August, 2006 in Prague, Czech Republic. Cambridge: Cambridge University Press, 2007, 138-138, (2007).

18. Sobouti, Y., "Trends in Basic Sciences in Contemporary Iran: The Growth and Cognitive Structure of Mainstream Basic Sciences", To appear in the proceedings of the "Interacademy Workshop on Science &Technology and the Future Development of Societies", Fondation des Treilles, Nice, June 26 - July 1, (2006).

19. Sobouti, Y., "The Morality of the Exact Sciences", To appear in the proceedings of the "Interacademy Workshop on Science &Technology and the Future Development of Societies", Fondation des Treilles, Nice, June 26 - July 1, (2006).

20. Sobouti, Y., "An f(R) Gravitation for Galactic Environments", Proceedings of the International Astronomical Union, Volume 2, Issue S238 (Black Holes from Stars to Galaxies – Across the Range of Masses), 451-452, (2006).

21. Sobouti, Y., "The Effect of Density Stratification on the Modal Structure of Solar Coronal Loops", 26th meeting of the IAU, Joint Discussion 3, 16-17 August, 2006, Prague, Czech Republic, JD03, 45-45, (2006).

22. Sobouti, Y., "Revised Dynamics or Dark Matter in Galactic Scales?, Edited by W. Sutantyo; P.W. Premadi; P. Mahasena; T. Hidayat and S. Mineshige", The 9th Asian-Pacific Regional IAU Meeting, held in Nusa Dua, Bali, Indonesia, 26-29 July 2005. ISBN: 979-3507-63-2, Publisher: Institut Teknologi Bandung Press, 2006, 218-218, (2006).

23. Sobouti, Y., "Alternative Dynamics or Dark Matter", The 9th Asian Pacific Reginal IAU Meeting

(APRIM 2005), July 26-29, Bali, Indonesia, (2005).

24. Sobouti, Y., "Dynamics of Compact Objects", Proceedings of 10th IASBS Conference on Astronomy, Feb., (2005).

25. Sobouti, Y., "Dark matter or the other dynamics", Iranian Journal of Physics Research, 5: (3), 113-119, (2005).

26. Sobouti, Y., Karami, K., Nasiri, S., "Flux Tube Oscillations and Coronal Heating", IAU 8th Asian-Pacific Regional Meeting, 1, 409-412, (2003).

27. Sobouti, Y., "Symmetries and Eigensolutions of Liouville's Equation", XXIII International Colloquium on Group Theoretical Methods in Physis Proceeding of the Colloquium, 2, 569-575, (2002).

28. Sobouti, Y., Rezania, V., "The R-Modes of Rotating Fluids", J. Royal Astron. Soc. Canada, 95: (4), 155-, (2001).

29. Sobouti, Y., "Eigensolutions of Antonov's Equation, in Stellar Dynamics: from Classis to Modern", Eds. Saint Pteresburg State University, 379-384, (2001).

30. Sobouti, Y., "Symmetries and Eigensolutions of Liouville's Equation, in Group Theoretical Methods in Physics", Joint Institute for Nuclear Research in press, (2001).

31. Sobouti, Y., Rezania, V., "The r-modes of rotating fluids ", Astron. & Astrophys. , 375: (2), 680-690, (2001).

32. Sobouti, Y., Rezania, V., "Liouville's Equation in Post Newtonian Approximation II. The Post Newtonian Modes ", Astron. Astrophys., 345: (3), 1115-1122, (2000).

33. Sobouti, Y., Rezania, V., "Liouville's equation in post Newtonian approximation. II. The post Newtonian modes", Astron. & Astrophys., 354: (3), 1115-1122, (2000).

34. Sobouti, Y., "Eigensolutions of Antonov's Equation in Stellar Dynamics: From Classic to Modern", Proceedings of the International Conference held in Saint Petersberg, August 21-27, 2000, 379-384, (2000).

35. Sobouti, Y., "Symmetries and eigensolutions of Liouville's equation", Proceedings, 23rd International Colloquium on Group Theoretical Methods in Physics (GROUP 23) : Dubna, Russia, July 31-August 5, 2000, 569-575, (2000).

36. Sobouti, Y., "Symmetries and eigensolutions of Liouville's equation", 22nd International

Colloquium on Group Theoretical Methods in Physics, 13-18 Jul 1998. Hobart, Tasmania, Australia , 569-575, (1998).

37. Sobouti, Y., "Contemporary Astronomy in Iran - A Status report", Highlights of Astronomy Vol. 11A, as presented at Joint Discussion 14 of the XXIIIrd General Assembly of the IAU, 1997. Edited by Johannes Andersen. Kluwer Academic Publishers, 1998., 739-739, (1998).

38. Sobouti, Y., Nasiri, S., "A Canonical Quantization in Phase Space Frontiers in Theoretical Physics", Turkish. J. phys., 19: (1), 458-464, (1995).

39. Sobouti, Y., "A quantization procedure in phase space resulting from symmetric treatment of configuration and momentum representations", 7th International Conference on Symmetry Methods in Physics, 10-16 Jul 1995. Dubna, Russia , (1995).

40. Sobouti, Y., "Astronomy in Iran", Suppl. J. Astrophys. Astr., 16, 469-, (1995).

41. Sobouti, Y., Dehghani, M. H., "A Lie Algebra of the Symmetries of Liouville's Equation", International Astronomical Union Colloquium, 132, 233-239, (1993).

42. Sobouti, Y., Nasiri, S., "A PHASE SPACE FORMULATION OF QUANTUM STATE FUNCTIONS ", Int. J. Mod. Phys. B, 7: (18), 3255-3272, (1993).

43. Sobouti, Y., Dehghani, M. H., "Liouville's equation. IV - The full symmetries of quadratic potentials", Astron. & Astrophys., 259: (1), 128-133, (1992).

44. Sobouti, Y., Hasan, S. S., "Classification of magnetospheric modes in sumpot umbrae ", Solar Photosphere: Structure, Convection, and Magnetic Fields Proceedings of the 138th Symposium of the International Astronomical Union Held in kiev,USSR, May 15–20, 1989, Stenflo, Jan (Ed.), 255-258, (1990).

45. Sobouti, Y., "Nonequilibrium ensembles: I. A Lagrangian formalism for classical systems", Physica A, 168: (3), 1021-1034, (1990).

46. Sobouti, Y., "Liouville's equation. I - Symmetries and classification of modes", Astron. Astrophys, 210: (1-2), 18-24, (1989).

47. Sobouti, Y., "Liouville's Equation - II Eigenmodes of Harmonic Potentials", Astron. & Astrophys., 214: (1-2), 83-91, (1989).

48. Sobouti, Y., Samimi, J., "Liouville's Equation - III Symmetries of the Linearized Equation", Astron. & Astrophys., 214: (1-2), 92-98, (1989).

49. Sobouti, Y., "Symmetries of Liouville's Equation", Proceedings of the Twentieth General Assembly, Baltimore 1988, (1988).

50. Sobouti, Y., Nasiri, S., "The normal modes of oscillations of fluids in the presence of magnetic fields", Vistas in Astronomy, 31: (1), 425-429, (1988).

51. Sobouti, Y., Ardakani, A. B., "Excitation of the normal modes of a binary member by its companion", Vistas in Astronomy, 31: (1), 351-355, (1988).

52. Sobouti, Y., "Radial and Non-Radial Oscillations of Spherically Symmetric Stellar Systems ", Advances in Helio- and Astroseismology: Proceedings of the 123th Symposium of the International Astronomical Union, Held in Aarhus, Denmark, July 7–11, 1986, Chapter 2, ISBN: 978-90-277-2615-5 , 123, 191-194, (1986).

53. Sobouti, Y., "Linear oscillations of isotropic stellar systems. III - A classification of non-radial modes", Astron. & Astrophys., 169: (1-2), 95-110, (1986).

54. Sobouti, Y., "Linear Density Waves in Globular Clusters", The Harlow-Shapley Symposium on Globular Cluster Systems in Galaxies: Proceedings of the 126th Symposium of the International Astronomical Union, Held in Cambridge, Massachusetts, U.S.A., August 25–29, 1986, Chapter X, ISBN: 978-90-277-2665-0 , 126, 693-, (1986).

55. Sobouti, Y., "Linear Density Waves in Globular Clusters", The Harlow-Shapley Symposium on Globular Cluster Systems in Galaxies, Proceedings of IAU Symposium No. 126 held 25-29 August 1986 in Cambridge, MA. Edited by J.E. Grindlay and A.G.D. Philip, 693-, (1986).

56. Sobouti, Y., "Radial and non-radial oscillations of spherically symmetric stellar systems", Astrophysics, 1-4, (1986).

57. Sobouti, Y., "Linear oscillations of isotropic stellar systems. II - Radial modes of energy-truncated models", Astron. & Astrophys. , 147: (1), 61-66, (1985).

58. Sobouti, Y., "Translation of stellar evolution, J. Meadows ", Dena Publishers, Tehran, (1984).

59. Sobouti, Y., "Linear oscillations of isotropic stellar systems. I - Basic theoretical considerations", Astron. & Astrophys. , 140: (1), 82-90, (1984).

60. Sobouti, Y., "Radial and nonradial Oscillations of spherically symmetric isotropic stellar system-Solution of Antonov's equation", 165th AAS Meeting, Tucson, Arizona, 16, 997-, (1984).

61. Sobouti, Y., "The Potentials for the G-P and the Toroidal Modes of Self-Gravitating Fluids", Astron. & Astrophys., 100, 319-322, (1981).

62. Sobouti, Y., Heydari Khajehpour, M. H., Dixit, V. V., "Normal modes of white dwarfs in Current problems in stellar pulsation instabilities", NASA Memorandum, 80625-513-80625-531, (1980).

63. Sobouti, Y., Dixit, V. V., Sarath, S. B., "Two basis sets for the g-and p-modes of self gravitating fluids ", Astron. & Astrophys., 89: (3), 259-263, (1980).

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65. Sobouti, Y., Khajehpour, M. R. H., Dixit, V. V., "The g-modes of white dwarfs in NASA. Goddard Space Flight Center Current Probl. in Stellar Pulsation Instabilities", Astrophysics, 513-531, (1980).

66. Sobouti, Y., "Convective Modes and Convective Stability of Rotating Fluids", Astron. & Astrophys. , 70, 665-675, (1978).

67. Sobouti, Y., "A definition of the g- and p-modes of self-gravitating fluids", Astron. & Astrophys., 55, 327-337, (1977).

68. Sobouti, Y., "Pure Perturbation Spectra of Convectively Neutral Fluids", Astron. & Astrophys., 55, 339-346, (1977).

69. Sobouti, Y., "The G and P modes of polytropes", Astron. & Astrophys., Suppl., 28, 463-468, (1977).

70. Sobouti, Y., Silverman, J. N., "An Expansion of Normal Modes of Self-Gravitating Fluids", Abstract in Bull. Am. Astron. Soc., 9, 338-, (1977).

71. Sobouti, Y., "On long-period hydromagnetic oscillations in gaseous masses", Astron. & Astrophys.: (5), 8-10, (1974).

72. Sobouti, Y., "On a Stability Criterion in Convective Media", Bull. Am. Astron. Soc., 5, 405-, (1973).

73. Sobouti, Y., "On a Bernoulli's integral pertaining to gas flow in close binary systems", Astrophys. Space Sci., 12: (2), 408-410, (1971).

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75. Sobouti, Y., "Scattering and Transmission Functions for Non-Coherent Scattering", Astrophys. J., 153, 257-266, (1968).

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77. Sobouti, Y., "Fluorescent Scattering in Planetary Atmospheres.IV. Formation of Lyman-Birge Bands of N_{2} in the Terrestrial Atmosphere", Astrophys. J. , 138, 748-760, (1963).

78. Sobouti, Y., "Propagation of Localized Disturbances in Hydromagnetic Media", Astrophys. J. , 138, 1163-1166, (1963).

79. Sobouti, Y., "CHANDRASEKHAR'S X-, Y-, AND RELATED FUNCTIONS RESEARCH", Astrophys, J., Suppl., VII, 411-560, (1962).

80. Sobouti, Y., "The relationship between unique geomagnetic and auroral events", J. Geophys. Res., 66: (3), 725-737, (1961).

81. Sobouti, Y., "Fluorescent Scattering in Planetary Atmospheres. II. Coupling among Transitions", Astrophys. J., 135, 938-954, (1961).

82. Rahvar, S., Sobouti, Y., "An Inverse f(R) Gravitation for Cosmic Speed Up, and Dark Energy Equivalent", Mod. Phys. Lett. A, 23: (23), 1929-1937, (2008).

83. Ter-Kazarian, G. T., Sobouti, Y., "An Extended Phase-Space Stochastic Quantization of Constrained Hamiltonian Systems", J. Phys. A: Math. Theor., 41: (31), 315303-1-315303-8, (2008).

84. Etemad, Sh., Sobouti, Y., "Trends in Basic Sciences in Contemporary Iran: Growth and Structure of Mainstream Basic Sciences", In Science and Technology and the Future Development of Societies, Editor: Glenn Schweitzer, National Research Council of the National Academies, the National Academies Press, Washington, D. C., 24-30, (2008).

85. Schwitzer, G., Sobouti, Y., "Understanding others the science way", Proceedings of the Workshop on " Science the Gateway to Understanding, Tehran, October 2008", 37-43, (2008). (Editors: Glenn Schwitzer and Yousef Sobouti, The National Academies Press, Washington, D.C., 2008)

86. Schweitzer, G., Sobouti, Y., "Science as a Gateway to Understanding: International Workshop Proceedings, Tehran, Iran", Publisher: The National Academies Press Washington D.C., ISBN: 0-309-12880-3 , 1-184, (2008).

87. Saffari, R., Sobouti, Y., "Erratum An f(R) gravitation for galactic environments", A & A , 472: (3), 833-833, (2007).

88. Nasiri, S., Sobouti, Y., Taati Asil, F., "Phase Space Quantum Mechanics – Direct", J. Math. Phys., 47: (9), 092106-1-092106-15, (2006).

89. Safari, H., Sobouti, Y., "An Exact Property of Small Oscillations of Rotating Stars in Solar and Solar-Like Oscillations: Insights and Challenges for the Sun and Stars", 25th meeting of the IAU, Joint Discussion 12, 18 July 2003, Sydney, Australia, (2003).

90. Rezania, V., Sobouti, Y., "Liouville's Equation in Post Newtonian Approximation I. Static Solutions ", Astron. Astrophys., 345: (3), 1110-1114, (2000).

91. Jalali, M. A., Sobouti, Y., "Some Analytical Results in Dynamics of Spheroidal Galaxies", Celest. Mech. Dyn. Astr., 70: (4), 225-270, (1998).

92. Khosroshahi, H. G., Sobouti, Y., "Response of a Star to Gravitational Waves", Astron. Astrophys., 321: (3), 1024-1026, (1997).

93. Khosroshahi, H. G., Sobouti, Y., "Stars as Gravitational Wave Detectors", J. Korean Astron. Soc., 29, S277-S278, (1996).

94. Dehghani, M. H., Sobouti, Y., "Dynamical Group of Liouville's Equation for Quadratic Potentials", Astron. Astrophys., 299, 293-296, (1995).

95. Samimi, J., Sobouti, Y., "On The Stability and Normal Modes of Polytropic Stellar Systems Using the Symmetries of Linearized Liouville's Equation", Astron. Astrophys., 297: (3), 707-716, (1995).

96. Dehghani, M. H., Sobouti, Y., "Liouville's equation: V. The full symmetries of r^ {-1} -potentials ", Astron. & Astrophys., 275, 91-95, (1993).

97. Tahmasebi, M. J., Sobouti, Y., "EXACT SOLUTIONS OF SCHRODINGER'S EQUATION FOR SPIN SYSTEMS IN A CLASS OF TIME DEPENDENT MAGNETIC FIELDS: II ", Mod. Phys. Lett. B, 6: (20), 1255-1261, (1992).

98. Ardakani, A. B., Sobouti, Y., "Excitation of Stellar Oscillations by Tidal Processes", Astron. & Astrophys., 227: (1), 71-76, (1990).

99. Nasiri, S., Sobouti, Y., "Global modes of oscillation of magnetized stars", Astron. & Astrophys., 217: (1-2), 127-136, (1989).

100. Hasan, S. S., Sobouti, Y., "Mode classification and wave propagation in a magnetically structured medium", Roy. Astron. Soc., Monthly Notices, 228: (2), 427-451, (1987).

101. Silverman, J. N., Sobouti, Y., "Normal modes of self gravitating fluids in perturbed configurations, I. Perturbational variational procedure ", Astron. & Astrophys., 62: (3), 355-363, (1978).

102. Silverman, J. N., Sobouti, Y., "18Normal modes of self gravitating fluids in perturbed configurations, II. Perturbational-variational expansion of the g- and p- modes of a nonadiabatic fluid about the adiabatic limit ", Astron. & Astrophys., 62, 365-374, (1978).

103. Chamberlain, J. W., Sobouti, Y., "Fluorescent Scattering in Planetary Atmospheres. I. Basic Theoretical Considerations", Astrophys. J., 135, 925-937, (1961).

104. Hasani Zonoozi, A ,.Haghi, H ,.Sobouti, Y" ,.Distinguishing between different alternative theories of gravity ,using different IMF's in stellar population synthesis models 14th Meeting on Research in Astronomy at IASBS, (2010)

105. Nasiri, S., Safari, H., Sobouti, Y., "Damping of MHD Waves as Heating Mechanism of Solar Corona", Solar and Stellar Physics Through Eclipses ASP Conference Series, Vol. 370, proceedings of the conference held 27-29 March, 2006 at Ankara University, ÖRSEM Campus, Side, Antalya, Turkey. Edited by O. Demircan, S. O. Selam, and B. Albayrak. San Francisco, 370, 68-73, (2007).

106. Safari, H., Nasiri, S., Sobouti, Y., "Fast Kink Modes of Longitudinally Stratified Coronal Loops", Astron. Astrophys. (A&A), 470, 1111-1116, (2007).

107. Karami, K., Nasiri, S., Sobouti, Y., "Normal Modes of Magnetic Flux Tubes and Dissipation", Astron. & Astrophys. (A&A), 396: (3), 993-1002, (2002).

108. Barut, Ao., Cruz, M. G., Sobouti, Y., "Localized Solutions of the Linearized Gravitational-Field Equations in Free-Space", Classical Quant. Grav, 11: (10), 2537-2543, (1994).

109. Moravveji, E., Guinan, E. F., Wasatonic, R., Sobouti, Y., Nasiri, S., "Investigating the Semi-Regular Light Variations of the bright M5 supergiant: α Herculis", Astrophys. Space Sci., 328: (1), 113-117, (2010).

110. Dadashi, N., Safari, H., Nasiri, S., Sobouti, Y., "Exact solutions for standing kink modes of the longitudinally stratified coronal loops", arXiv:0802.1322, (2008).

111. Safari, H., Nasiri, S., Karami, K., Sobouti, Y., "Resonant Absorption in Dissipative Flux Tubes", Astron. & Astrophys. (A&A), 448: (1), 375-378, (2006).

112. Yaftian, M. R., Zamani, A., Parinejad, M., Sobouti, Y., "Ion-pair extraction of cadmium complex anions from hydrochloric acid media using oxonium ion-dicyclohexyl-18-crown-6 complex", Sep. Purif. Tech., 42, 175-180, (2005).

113. ثبوتی، ی. "زمین گرم می‌شود" (۱۳۹۰). انتشارات موسسه جغرافیایی و کارتوگرافی گیتا شناسی، شماره چاپ ۱. ۱-۲۳۳. ایران.

114. ثبوتی، ی. "ماده تاریک یا دینامیک دیگر؟". (۱۳۸۴). مجله پژوهش فیزیک ایران. ۵: (۳), ۱۱۳-۱۱۹. ایران

- **Publications (Books)**
  - Warmed Earth: What has the climate of the 21st Century to offer, Gita Shenasi Press, Tehran, (a book on climate change for Persian speaking communities), 2011.
  - Relativity: Special and General, Markaz Nashre Daneshgahi Publications, (a book for Persian graduate students), 2018.
  - Lasting faces: Prof. Yousef Sabouti. Publishers: Zaman, Jahane Farhang, 2004.
  - Science the Gateway to Understanding, Proceedings of the Workshop on, Tehran, October 2008, Editors: Glenn Schweitzer and Yousef Sobouti, The National Academies Press, Washington, D.C., 2008.
  - Stellar Evolution (by Jack Meadows), translation (1984), Dena Press, Iran.
  - Thermal physics (Book by Philip M. Morse), translation (1993), Nashre Daneshgahi Press, Iran.
  - Commitments of the Islamic Republic of Iran to Climate Change. (2017). (2015 Paris Conference), on the order of the Researchers Support Fund, Letter of the Academy of Sciences, Iran.
  - Letter of the Academy of Sciences, Iran. Journal of the Academy of Sciences of the Islamic Republic of Iran. No. 3, (Summer 2018). Academy of Sciences Publications.
  - Thermodynamics and Statistical Mechanics, (2020), (Revisions and additions are in progress).

II Conferences and educational activities

II a Conferences and Other External Scientific Work

- **Conferences**
  - Sientifice Comitee Member of 6 Regional Conferences on Climate Change and Global Warming, Center for Research in Climate Change and Global Warming, IASBS
  - Sientifice Comitee Member of 23 National Meetings on Research in Astronomy, IASBS

- **Major contributions to institutional developments**

  Responsible for the initial conception and realization of Biruni Observatory, Shiraz University, Shiraz, Iran 1971-1975, and Director of the Observatory, 1975-1980

  Responsible for the creation and development of graduate studies in physics (M.Sc., 1967 and Ph.D., 1986), Shiraz University, Shiraz, Iran

Responsible for the initial conception and creation of Institute for Advanced Studies in Basic Sciences, Gava Zang, Zanjan, Iran, 1991, Director, 1991-2010

Responsible for the initial conception and creation of Abdul - Rahman Sufi College (a private 1st degree college science and humanity), 2004, Head of the Board of Trustees, 2004 - present

Founding member of the Physical Society of Iran, 1983-present

Founding member of the Astronomical Society of Iran, 1987-present

Founding member of the Iranian Society of Ethics in Science and Technology, 2004-present

- **Memberships and fellowships in societies and scientific organizations**

Founding member and member of the Board of Directors of the Physical Society of Iran, 1983-1988, President, 1989-1991 and 1996-2000

Founding member of the Astron. Soc. of Iran, 1987, President 1987-1993 and 1996-9

Member of the American Astronomical Society, 1968-2002

Member of the International Astronomical Union, Commissions 28, 35, 1969 present

Founder of Birouni Observatory, Shiraz, Iran, 1971

Iranian Journal of Science and Technology, Board of Advisors, 1971-1976, Board of Editors 1983 -1990

Iranian Journal of Physics, Board of Advisors, 1987 - present

Member of the Third world Academy of Science, 1987 - present

Member of the Academy of Sciences of Iran, 1989 - present

Member of the Scientific Council, International Center for Theoretical Physics, Trieste, Italy, appointed by UNESCO and IAEA, 1989-1992

Founder of Institute for Advanced Studies in Basic Sciences, Zanjan, Iran 1991

Member of Board of Trustees of The Regional Library of Science and Technology, appointed by the Ministry of Culture and Higher Education of Iran, 1991-1998

Member of the Board of Trustees of the University of Medical Sciences of Zanjan, 2004

Member of Technical Advisory Committee of Commission on Science and Technology for Sustainable Development in the South (COMSATS), 2004

Member of the International Advisory Committee, Marcel Grossmann Meetings, a la Sapiensa-based (Rome, Italy) annual conference in Honor of Marcel Grossman, the mathematician who helped Einstein to formulate his General Relativity, 2006 – present

Founder of Sufi School of Business, a graduate school, stationed in Zanjan, in progress since 2015

II b Work With Students

II c Diploma thesis supervision

- Over 50 students, between 1964 to 1990
- After 1990 to 2018:

Supervision:

1. Mehdi Haghi, MSc, Thesis title: “Symmetries of the Liouville equation for the simple coordinate potential”, Shiraz University, Graduation date: 1990

2. Amir Hosein Fariborz, MSc, Thesis title: “Outdoor synchronous oscillator”, Shiraz University, Graduation date: 1990

3. Mansour Haghighat, MSc, Thesis title: “Eigenvalues of Liouville operator functions with simple coordinate potential”, Shiraz University, Graduation date: 1990

4. Mohammad Ali Hoseinpour Feizi, MSc, Thesis title: “Chaos in simple quantum systems”, Shiraz University, Graduation date: 1990

5. Ali Mohammad Jamilzadeh, MSc, Thesis title: “Chaos in classical dynamical systems”, Shiraz University, Graduation date: 1990

6. Sadollah Nassiri Gheydari, PhD, Thesis title: “Cannon formulation of quantum statistical mechanics”, Shiraz University, Graduation date: 1992

7. Mohammad Hosein Dehghani, PhD, Thesis title: “Liouville Equation Symmetry Group”, Shiraz University, Graduation date: 1992

8. Javad Tahmasebi Birgani, PhD, Shiraz University, Graduation date: 1992

9. Hasan Ranjbar Asgari, MSc, Thesis title: “Spherical solutions of Brans-Dicke equations”, Shiraz University, Graduation date: 1994

10. Hamid Reza Khalesifard, PhD, Thesis title: “Two wave mixing as a new method for measurement of nonlinear refractive index”, Shiraz University, Graduation date: 1996

11. Mansour Haghighat, PhD, Thesis title: “Heavy Hadron weak decay form factors”, Shiraz University, Graduation date: 1996

12. Hossein Hakimi Pajouh, MSc, Thesis title: “Phase Transition and Dynamic Exponets for Convective Motions in Nondissipative Fluids”, IASBS, Graduation date: 1995

13. Reza Alemi, MSc, Thesis title: “Quantum Behavior of Accelerated Electrons as Dissipative Quantum System”, IASBS, Graduation date: 1995

14. Malek Zareyan, MSc, Thesis title: “Dirac Equation in the Randers Metric and Hydrogen Atom in the Finslerian Formalism”, IASBS, Graduation date: 1995

15. Ali Nayeri, MSc, Thesis title: “Tethered Surfades and Space-Time: A Model for the Universe”, IASBS, Graduation date: 1995

16. Habib Gharar Khosroshahi, MSc, Thesis title: “The effect of gravitational waves on stars|”, IASBS, Graduation date: 1996

17. Mahmood Hoseini Farzad, PhD, Thesis title: “Four-wave vortex combination without approximation of slow amplitude changes and its quantum properties”, Shiraz University, Graduation date: 1996

18. Morteza Bayat, MSc, Thesis title: " Classification of Certain Plane Curves Satisfying R=f(d)" , IASBS, Graduation date: 1996

19. Hassan Firuzjahi, MSc, Thesis title: “Patterns Formation in Statistical Description of Hydrodynamical Instabilities”, IASBS, Graduation date: 1997

20. Peyman Ahmadi, MSc, Thesis title: “Long Period Magnetic Phenomena in the Sun as Hydromagnetic Mades of Oscillation”, IASBS, Graduation date: 1998

21. Mohammad Rahim Bordbar, MSc, Thesis title: “An Introduction to flame spectrophotometry”, Shiraz University, Graduation date: 1998

22. Maziyar Khosravi, MSc, Thesis title: “Boson stars in post-Newtonian approximation and poly-tropical structure”, Shiraz University, Graduation date: 1998

23. Arezoo Dianat, MSc, Thesis title: “Hydrogen Atom in Friedmann Universe”, IASBS, Graduation date: 1999

24. Vahid Rezania, PhD, Thesis title: “Normal Modes of Relativistic Systems in Postnewtonian Approxi- Mation and Thestability Curve ofr - Modes in Neutron Stars”, IASBS, Graduation date: 1999

25. Shahram Abbasi, MSc, Thesis title: “A Study of g-Modes of Oscillation of the Sun”, IASBS, Graduation date: 2000

26. Yousef Ali Aabedini, PhD, Thesis title: “Free earth oscillations”, IASBS, Graduation date: 2000

27. Ahmad Hosseini Zadeh, MSc, Thesis title: “Brightness Fluctuations in Globular Clusters”, IASBS, Graduation date: 2001

28. Kayoomars Karami, PhD, Thesis title: “Coronal Heating by Damping of MHD Waves and Third Order Effect of Rotation on Stellar Oscillations”, IASBS, Graduation date: 2003

29. Jalil Naji Damirani, MSc, Thesis title: “Mass Distribution Function for Self-Gravitating Spherical System”, IASBS, Graduation date: 2004

30. Hosein Safari, PhD, Thesis title: “Solar Coronal Plasma Heating I. Loops Oscillations and Resonant Absorption II. Nano-Flares Heating”, IASBS, Graduation date: 2006

31. Fatemeh Taati Asil, PhD, Thesis title: “Phase Space Quantum Mechanics-An Extended Phase Formalism Approach”, IASBS, Graduation date: 2006

32. Hadi Rahmani Baygi, MSc, Thesis title: “Long Term Lumitiosity Variations and Orbital Period Changes in CG CYg”, IASBS, Graduation date: 2006

33. Seyed Hossein Razizadeh, MSc, Thesis title: “A Chromospheric Activity Study of the Binary Star ER Vul Peculae”, Zanjan University, Graduation date: 2006

34. Akram Hassani Zonoozi, PhD, Thesis title: “I. Initial Mass Function: a Distinguishing Factor for Gravity Models II. The Flattening of the Mass Function of the Globular Cluster Palomar 14”, IASBS, Graduation date: 2011

35. Zohreh Ghaffari, MSc, Thesis title: “Metallicity of Starburst Galaxies in Chandra Deep Field South (CDF-S)”, IASBS, Graduation date: 2011

36. Parvin Mostafavi, MSc, Thesis title: “Physical Characteristics of Early Type Galaxies at Redshift 0.3<2<1”, IASBS, Graduation date: 2011

37. Ehsan Moravveji, PhD, Thesis title: “Analysis of the Observational Data of the Blue Supergiant Star Rigel: An Asteroseismological Approach”, IASBS, Graduation date: 2012

38. Amir Naghavi Azad, MSc, Thesis title: “Projecting the Climate of Iran and Its Geographical Neighbours Using Regional Climate Model (RegCM)”, IASBS, Graduation date: 2013

39. Mehdi Mahmoodi, MSc, Thesis title: “Planetary Atomospheres in Solar System”, IASBS, Graduation date: 2014

40. Mahdi Yousefzadeh Soraki, MSc, Thesis title: “Automatic Identification of Supergranular Cell Boundaries”, IASBS, Graduation date: 2014

41. Roohollah Lotfi, MSc, Thesis title: “Study of the atmosphere of the planets of the solar system”, Abdolrahman Sufi Razi Higher Educational Institute, Graduation date: 2014

42. Nasim Ildartanha, MSc, Thesis title: “Reconstructing the Solar Magnetic Field by a Lagrange Multiplier Technique Subject to the Helicity Conservation”, IASBS, Graduation date: 2015

43. Rasul Darvishizadeh, MSc, Thesis title: “Forecast of Iran's climate and its geographical neighbors from 2010 to 2030 using RegCM regional model”, IASBS, Graduation date: 2015

44. Behzad Tahmasebzadeh, MSc, Thesis title: “Inflationary Cosmological Models in Scalar-Tensor Gravity “, IASBS, Graduation date: 2015

45. Zahra Ghafourizadeh, MSc, Thesis title: “The Effect of Dark Energy on Dynamics of Galaxy Clusters”, IASBS, Graduation date: 2015

46. Saeed Rajani, MSc, Thesis title: “Perturbed Metric and its Application in Cosmology”, IASBS, Graduation date: 2016

47. Mohammad Bagher Jahani Poshteh, PhD, Thesis title: “Black Holes in Horava-Lifshitz and Einsteinian Cubic Gravities: Thermodynamics, Phenomenology”, IASBS, Graduation date: 2018

Advisor:

48. Habib Gharar Khosroshahi, PhD, Thesis title: “The Photometric Plane of Galaxies”, IASBS, Graduation date: 2000

49. Iraj Gholami Ghadikolaei, MSc, Thesis title: “A New Technique to Study the Variability of the Sun and Data Analysis”, IASBS, Graduation date: 2001

50. Mahyar Madadi, PhD, Thesis title: “Lattise Boltzmann Simulation of Fluid Flow and Dispersion in Fracture Networks With Self-Affine Surface”, IASBS, Graduation date: 2002

51. Mohammad Taghi Mirtorabi, PhD, Thesis title: “Near Infrared Tio Band and Visual Photometry of Pulsating Giant and Chromospherically Active Stars”, Zanjan University, Graduation date: 2002

52. Sharareh Tavaddod, MSc, Thesis title: “Correction of Tip-Tilt Aberration with Adaptive Optics”, IASBS, Graduation date: 2003

53. Ebrahim Karimi, MSc, Thesis title: “A Study on Laser Cooling and Trapping of Neutral Atoms”, IASBS, Graduation date: 2003

54. Rozita Mohebbi, MSc, Thesis title: “Velocity Curve Analysis of the Spectroscopic Bjnary Stars”, IASBS, Graduation date: 2006

55. Narges Fathalian, MSc, Thesis title: “Investigation of Galactic Disks Rotation Curve in Modified Gravity”, IASBS, Graduation date: 2006

56. Hossein Teimoorinia, PhD, Thesis title: “Physical Properties of Distant Galaxies from Spectro-Photometric Analysis of Multi-Wavelength, Multi-Observatory Deep Surveys”, IASBS, Graduation date: 2010

57. Fateme Amirkhanlou, MSc, Thesis title: “Segmentation of Solar Coronal Image; Application of Neural Networks”, IASBS, Graduation date: 2010

58. Mostafa Rajabi Ebgha, MSc, Thesis title: “Measurement of Tree Growth Using Moire Technique”, IASBS, Graduation date: 2012

II d Other Teaching Duties

- Teacher, High school, Tabriz, Iran, 1953-1956
- Teacher, Cartographic Organization of Iran, Tehran, 1956-1958

- Teaching various physics courses, Shiraz University, 1964 - 1988
- Teaching Physics courses (such as Quantum Mechanics, Gravity, Electrodynamics, Classical Mechanics, General Relativity, Structure and Evolution of Galaxies, Climate Change and Global Warming, Special Relativity, Symmetry and Principles of Conservation and Continuity Equations, statistical mechanics, Thermodynamics), IASBS, Zanjan, 1991 to present

II e. Work With Postdocs

1. "Calculate the torque applied to spherical particles, Double break in optical tweezers", Researcher: Ibrahim Madadi, Supervisor: Prof. Yousef Sabouti, Start Date: 2013/08/23, Date of Completion: 2013/11/21, Admission of postdoctoral researcher Allameh Tabatabai Award of the National Elite Foundation.

2. "Modeling and Assessment Time Series Climate Data in National and Regional Level Using Neural Network and Comparing with IPCC Projections", Researcher: Fereshteh Jadari, Supervisor: Prof. Yousef Sabouti, Start Date: 2014/08/23, Date of Completion: September 2015, Admission of postdoctoral researcher Allameh Tabatabai Award of the National Elite Foundation.

3. "Development and application of new Chemometric methods for the Assessment of effects of global change on natural systems from environmental monitoring and climate change data", Researcher: Mahsa Dadashi, Supervisor: Prof. Yousef Sabouti, Start Date: 2014/05/22, Date of Completion: May 2015, Admission of postdoctoral researcher Allameh Tabatabai Award of the National Elite Foundation.

4. "Study of noncommutativity on the scalar field models and its role in accelerated expansion of the Universe", Researcher: Heidar Sheikh Ahmadi, Supervisor: Prof. Yousef Sabouti, Start Date: 2015/09/23, Date of Completion: July 2017, Admission of postdoctoral researcher Allameh Tabatabai Award of the National Elite Foundation.

5. "Investigation of the synchronic effect of synaptic delay and oscillation frequency heterogeneity on neuronal symmetry", Researcher: Ehsan Bolhasani, Supervisor: Prof. Yousef Sabouti and Dr. Alireza Valizadeh, Start Date: 2015/09/23, Date of Completion: October 2016, Admission of postdoctoral researcher Allameh Tabatabai Award of the National Elite Foundation.

6. "Criticality hypothesis and its relation to memory in the brain", Researcher: Amin Mousavi, Supervisor: Prof. Yousef Sabouti and Dr. Alireza Valizadeh, Start Date: 2015/09/23, Date of Completion: May 2017, Admission of postdoctoral researcher Allameh Tabatabai Award of the National Elite Foundation.

7. "Investigation of Doppler effect and linear profiles with one-dimensional hydrodynamic model of rings (P-H) in Transition area (Moss area)", Researcher: Edris Tajfiroozeh, Supervisor: Prof. Yousef Sabouti, Start Date: February 2017, Date of Completion: February 2019, Admission of postdoctoral researcher of Iran National Science Foundation.

8. "Investigation of Doppler effect and linear profiles with one-dimensional hydrodynamic model of rings (P-H) in Transition area (Moss area)", Researcher: Hamed Ghasemi, Supervisor: Prof. Yousef Sabouti, Start Date: June 2017, (In progress), Admission of postdoctoral researcher of the National Elite Foundation.

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. The Second ICRA Network Workshop, The Chaotic Universe, Pescara, Rome, Italy, February 1999

2. Adjunct Professor, International Center for Relativistic Astrophysics Network (ICRANet), Pescara, Italy, 2015

III b. Outside ICRANet

1. IAU 13th. General assembly, Prague, 1967
2. IAU Sym. on planetary nebulae, Czechoslovakia, August 1967
3. IAU 14th, General Assembly, Brighton, 1972
4. Black hole astrophysics, Les Houches, August 1972
5. Summer Session on Theory Astrophysics, Trieste, August 1973
6. AAS 141st Meeting, Tuscan, December 1973
7. AAS 143rd Meeting, Rochester, August 1974
8. International School of Physics (E. Fermi), Isolated gravitating systems in General Relativity, Varenna, July 1976
9. IAU Colloquium 38, Stellar Convection, Nice, France, August 1976
10. AAS 150th Meeting, Atlanta, June 1977
11. IAU Symposium 76, Planetary Nebulae, Cornell, June 1977
12. Conference on current problems in stellar pulsation instabilities, Baltimore, June 1978
13. IAU, 17th General Assembly, Montreal, August 1979
14. Third Marcel Grossmann Meeting, Shanghai, 1981 (and member of International Advisory Committee)
15. AAS 164th Meeting, Tucson, January 1985
16. IAU Symposium 123, Helio- and astro-seismology, Aarhus, Denmark, July 1986

17. IAU Symposium 126, Globular systems in galaxies, Harvard, Cambrige, August 1986

18. Guest scientist, International Center for Theoretical Physics, Trieste, Summer 1986

19. Aspen Center for Physics, Workshop on Galaxies, June 1987

20. Second Regional Conference on Mathematical Physics, Adana, Turkey, 1987

21. Visiting Fellow, International Center for Theoretical Physics, Trieste, Summer 1988

22. IAU 20th General Assembly, Johns Hopkins University, August 1988

23. Visiting fellow, International Center for Theoretical Physics, Trieste, Summer 1989

24. Fourth Regional Conference on Mathematical Physics, Tehran, Iran 1990

25. Colloquium 132, International Astronomical Union, Problems of stability and instability in stellar system, Delhi October 1990

26. Wigner symposium, Gosslar, Germany, July 1991

27. Third World Academy of Science, General Assembly, Kuwait, October 1992

28. 6th Asian Pacific Regional Meeting of the IAU, Pune, India, August 1993

29. Frontiers in Theoretical Physics, Edirne, Turkey, December 1993

30. IAU 22nd General Assembly, The Hague, August 1994

31. VII International Conference on Symmetry Methods in Physics, Dubna, Russia, 1995

32. Third World Academy of Science, 5th General Assembly, Abuja, Nigeria, Septamber 1995

33. The 7th Asian-Pacific Regional of IAU Meeting, Pusan, Korea, August 1996

34. Inter University Centre for Astronomy & Astrophysics (IUCAA), Pune, India, August 1997

35. 23rd General Assembly Meeting, IAU, Kyoto, Japan, August 1997

36. 6th General Assembly of The Third World Academy of Sciences (TWAS) and the Third Network of Scientific Organizations (TWNSO), Rio does Janerio, Brazil, September 1997

37. The Third World Academy of Sciences (TWAS), Trieste, Italy, November 1997

38. 10th General Meeting, The Third World Academy of Sciences (TWAS), Trieste, Italy, December 1998

39. 7th General Assembly, The Third World Academy of Sciences (TWAS), Dakar, Senegal, November 1999

40. International Colloquium on Group Theoretical Methods in Physics, Dubna, Russia, August 2000

41. Stellar Dynamics from Classic to Modern, San Petersburg, Russia, August 2000

42. 12th General Meeting, Third World Academy of Sciences, Tehran, October 2000

43. Canadian Astronomical Society, Annual Meeting, McMaster University, Hamilton, May 2001

44. 8th General Assembly The Third World Academy of Sciences (TWAS), New Delhi, India, October 2001

45. Potsdam University, Invited lecturer, Potsdam, Germany, March 2002

46. IAU 8th Asian-Pacific Regional Meeting, Tokyo, Japan, July 2002

47. 25th General Assembly Meeting, IAU, Sydney, Australia, July 2003

48. 9th General Assembly The Third World Academy of Sciences (TWAS), Beijing, China, October 2003

49. 15th General Meeting, Third World Academy of Sciences, Trieste, Italy, October 2004

50. National Academy of Science of Armenia and Byurakan Astrophysical Observatory, Invited Lecturer, Yerevan, Armenia, March 2004

51. IAU 9th Asian-Pacific Regional Meeting, Bali, Indonesia, July 2005

52. 16th General Meeting, Third World Academy of Sciences, Alexandria, Egypt, December 2005

53. Inter-Academy Workshop on Science & Technology and the Future Development of Societies, Invited lecturer and head of the Iranian Delegation, Nice, France, June 2006

54. 11th Marcel Grossmann Meeting, Berlin, Germany, July 2006

IV. Other

HONORS

Recipient of Medallion for Excellence in Research, Government of Iran, 1978

Fellow of The Third World Academy of Sciences, elected 1987

Fellow of The Academy of Sciences of Iran, elected 1990

Award of the Book of the Year of the Islamic Republic of Iran, 1995

TWAS 2000 Medal Lecturer in Physical Sciences, Tehran, October 2000

Khwarazmi Award, 2001

The Lasting Face in Science, Tehran, October 2001

Iranian Physics Association celebration, Called the annual physics conference in 2002 as Sobouti's conference, 2002

Afzalipour Award, for Outstanding Research in Physics, 2005

Islamic Development Bank, Prize in Science and Technology for Institute for Advanced Studies in Basic Sciences – Zanjan under the directorship of Prof Yousef Sobouti, 2006

Chair of Research in Physics, Fund for Research Support in Iran, 2007

Exemplary Professor, "Ministry of Science, Research and Technology", 2008

TWAS Regional Office Prize for Scientific Institution Building in Central and south Asian Region, Bangalore, 2012

Allamah Tabtabaee Prize, as Distinguished Scientist, Tehran, 2013

Selected scientist of the Academy of Sciences, and proposed to the President to receive the 1st degree scientific award, 2013

Non science publications

Trends in Basic Sciences in Contemporary Iran: Growth and Structure of Mainstream Basic Sciences", (with Sh. Etemad)In Science and Technology and the Future Development of Societies, Editor: Glenn Schweitzer, National Research Council of the National Academies, the National Academies Press, Washington, D. C., 24-30, 2008.

The Morality of Exact Sciences, In Science and Technology and the Future Development of Societies, Editor: Glenn Schweitzer, National Research Council of the National Academies, the National Academies Press, Washington, D. C., 10-13, 2008.

Understanding others the science way, Proceedings of the Workshop on " Science the Gateway to Understanding, Tehran, October 2008", Editors: Glenn Schwitzer and Yousef Sobouti, The National Academies Press, Washington, D.C., 2008.

Review of Cosmic Anger: Abdus Salam — the First Muslim Nobel Scientist, the Mathematical Association of America, Online, 2008.

2019 List of Publication

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Full Professor at the Federal University of Rio Grande do Sul - UFRGS, Porto Alegre, Brazil and Adjunct Professor at the ICRANet Faculty - International Center for Relativistic Astrophysics Network (Rome's La Sapienza University and ICRANet Center in Pescara, Italy). CAPES-ICRANet senior program). He has a bachelor's degree (1975), a master's degree (1978) and a doctorate (1986) in Physics from the Federal University of Rio Grande do Sul, Porto Alegre. He has research experience in Nuclear Physics, with emphasis on Nuclear Structure and Relativistic Nuclear Astrophysics, in Physics of Particles, in Field Theory and Gravitation, acting mainly in the following subjects: nuclear matter, neutron stars. quark stars, quasi-free scattering, and gravitation. He has experience in advising doctoral students in Brazil and abroad, has published more than 150 scientific papers in international journals, and has edited several scientific books, organized several scientific conferences of international (more than 25) and national (more than 20) scopes and has edited memoirs of these conferences. He was Pro-Rector of Research at UFRGS (from 2004 to 2008), member of the State Council of Science, Technology and Innovation of the State of Rio Grande do Sul, Brazil (from 2006 to 2010), and member of the National System of Processing of High Performance - SINAPAD (from 2004 to 2008).
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Formal Education/Degree

1981 - 1986 Ph.D. in Física .
Universidade Federal do Rio Grande do Sul, UFRGS, Brasil. *Year of degree:* 1986.
Advisor: THEODOR AUGUST JOHANNES MARIS.
Keywords: Espalhamento Quase-Livre; PRÓTONS POLARIZADOS; ESTRUTURA NUCLEAR.
Major Area: Exact and Earth Sciences.

1975 - 1978 Master´s in Física .
Universidade Federal do Rio Grande do Sul, UFRGS, Brasil. *Year of degree:* 1978.
Advisor: THEODOR AUGUST JOHANNES MARIS.
Grantee of: Conselho Nacional de Desenvolvimento Científico e Tecnológico ,CNPq ,Brasil .
Keywords: Espalhamento Quase-Livre; Sistemas Nucleares; Polarizacao; Muitos Corpos.
Major Area: Exact and Earth Sciences.

1971 - 1975 Graduation in Fisica .
Universidade Federal do Rio Grande do Sul, UFRGS, Brasil.

Postdoctorate

1988 - 1990 Postdoctorate.
Universitat Erlangen-Nurnberg (Friedrich-Alexander), UEN*, Alemanha.
Grantee of: Conselho Nacional de Desenvolvimento Científico e Tecnológico ,CNPq ,Brasil .
Major Area: Exact and Earth Sciences.

Complementary Education

2014 - 2015 Bolsista Senior da CAPES.
Università degli Studi di Roma La Sapienza, UNIROMA, Itália.

Professional Experience

Universidade Federal do Rio Grande do Sul, UFRGS, Brasil.

Contract

1985 - Present Type of contract: Government Employee, Functional Placement: , Exclusive Dedication.

Contract

1980 - 1985 Type of contract: Government Employee, Functional Placement: , Exclusive Dedication.

Contract

1978 - 1980 Type of contract: Professor Colaborador, Functional Placement: , Credit Hours: 40

Activities

3/1990 - Present Teaching, Física, Degree: Pos-Graduation.

Disciplines Taught
FÍSICA NUCLEAR TEÓRICA I
FÍSICA NUCLEAR TEÓRICA II
SEMINÁRIOS EM FÍSICA NUCLEAR TEÓRICA I
SEMINÁRIOS EM FÍSICA NUCLEAR TEÓRICA II
SEMINÁRIOS TÓPICOS EM FÍSICA DE HÁDRONS E LÉPTONS
ESTRELAS COMPACTAS I
ESTRELAS COMPACTAS II

2/1990 - Present Manager and Administrative Positions, Instituto de Física, Departamento de Física.

Position or Function
.

8/1985 - Present Research and Development , Instituto de Física, Departamento de Física.

09/2004 - 09/2008 Manager and Administrative Positions, Pró-Reitoria de Pesquisa, .

Position or Function

8/1978 - 1/2000 Teaching, Degree: Graduation.

Disciplines Taught
FÍSICA NUCLEAR
FÍSICA GERAL I
FÍSICA GERAL II
FÍSICA GERAL III
FÍSICA GERAL IV
FÍSICA NUCLEAR E DE PARTÍCULAS
FÍSICA EXPERIMENTAL I

12/1993 - 12/1995 Manager and Administrative Positions, Instituto de Física, Departamento de Física.

Position or Function
Head of Department.

8/1975 - 7/1985 Research and Development , Instituto de Física, Departamento de Física.

Universitat Erlangen-Nurnberg (Friedrich-Alexander), UEN*, Alemanha.

Contract

1990 - 1999 Type of contract: Visiting Professor, Functional Placement: , Credit Hours: 40, Exclusive Dedication.

Contract

1988 - 1990 Type of contract: Bolsista Pós-Doutorado, Functional Placement: , Exclusive Dedication.

Activities

02/1988 - 01/1990 Research and Development , Institut Für Theoretische Physik, Institut Für Theoretische Physik III.

Areas of Expertise

1. *Major Area:* Exact and Earth Sciences / *Area:* Physics / *Subarea:* Física Nuclear / *Specialty:* Estrutura Nuclear.
2. *Major Area:* Exact and Earth Sciences / *Area:* Astronomy / *Subarea:* Astrofísica Estelar.

Languages

German Comprehends Reasonably, Speaks Reasonably, Reads Reasonably, Writes Little.

English Comprehends Well, Speaks Well, Reads Well, Writes Well.

Spanish Comprehends Well, Speaks Reasonably, Reads Well, Writes Reasonably.

French Comprehends Reasonably, Speaks Little, Reads Well, Writes Little.

Italian Comprehends Well, Speaks Reasonably, Reads Well, Writes Little.

Scientific, Technological, Artistic and Cultural Production

Bibliographical Production

Articles in Scientific Journals

1. doi RAZEIRA, M. ; HADJIMICHEF, D. ; MACHADO, M. V. T. ; KÖPP, F. ; VOLKMER, G. ; BODMANN, B. ; DEGRAZIA, G. A. ; VASCONCELLOS, C. A. Z. . Effective field theory with genuine many-body forces and tidal effects on neutron stars. ASTRONOMISCHE NACHRICHTEN JCR, v. 340, p. 209-212, 2019.

2. doi VOLKMER, G. L. ; RAZEIRA, M. ; HADJIMICHEF, D. ; KÖPP, F. ; VASCONCELLOS, C. A. Z. ; BODMANN, B. . Pseudo-complex general relativity and the slow rotation approximation for neutron stars. ASTRONOMISCHE NACHRICHTEN JCR, v. 340, p. 205-208, 2019.

3. doi Zen Vasconcellos, C. A. ; RAZEIRA, M. ; BODMANN, B. . The effective relativistic quantum field theory for nuclear matter with many-body forces revisited. ASTRONOMISCHE NACHRICHTEN JCR, v. 340, p. 199-204, 2019.

4. doi GOMES, ROSANA O. ; VASCONCELLOS, CESAR A. Z. ; FRANZON, BRUNO ; SCHRAMM, STEFAN ; DEXHEIMER, VERONICA . Highly Magnetized Neutron Stars in a Many-body Forces Formalism. INTERNATIONAL JOURNAL OF MODERN PHYSICS: CONFERENCE SERIES JCR, v. 45, p. 1760033, 2017.

5. doi COSTA, J. E. S. ; HADJIMICHEF, D. ; MACHADO, M. V. T. ; KÖPP, F. ; VOLKMER, G. L. ; RAZEIRA, M. ; VASCONCELLOS, C. A. Z. . Equilibrium configurations of white dwarfs in the pseudo-complex general relativity. ASTRONOMISCHE NACHRICHTEN JCR , v. 338, p. 1085-1089, 2017.

6. doi RAZEIRA, M. ; HADJIMICHEF, D. ; MACHADO, M.V.T. ; KÖPP, F. ; VOLKMER, G.L. ; VASCONCELLOS, C.A.Z. . Effective field theory for neutron stars with WIMPS in the pc-GR formalism. ASTRONOMISCHE NACHRICHTEN JCR, v. 338, p. 1073-1078, 2017.

7. doi HADJIMICHEF, D. ; MACHADO, M.V.T. ; KÖPP, F. ; VOLKMER, G.L. ; RAZEIRA, M. ; VASCONCELLOS, C.A.Z. . A dark matter compact star in the framework of the pseudo-complex general relativity. ASTRONOMISCHE NACHRICHTEN JCR, v. 338, p. 1079-1084, 2017.

8. doi Zen Vasconcellos, César ; COELHO, HELIO T. ; HESS, PETER OTTO . Walter Greiner: In Memoriam. INTERNATIONAL JOURNAL OF MODERN PHYSICS: CONFERENCE SERIES JCR, v. 45, p. 1760001, 2017.

9. doi GOMES, R. O. ; DEXHEIMER, V. ; SCHRAMM, S. ; VASCONCELLOS, C. A. Z. . MANY-BODY FORCES IN THE EQUATION OF STATE OF HYPERONIC MATTER. Astrophysical Journal (Online) JCR, v. 808, p. 8, 2015.

10. doi DOS SANTOS, A. L. ; VASCONCELLOS, C. A. Z. . Z ' decay and dark matter relic density in a Stueckelberg extension of the Standard Model. ASTRONOMISCHE NACHRICHTEN JCR, v. 336, p. 900-904, 2015.

11. doi MESQUITA, A. ; RAZEIRA, M. ; RUFFINI, R. ; RUEDA, J. A. ; HADJIMICHEF, D. ; GOMES, R. O. ; Zen Vasconcellos, C. A. . An effective field theory for neutron stars with many-body forces, strong ∑ ⁻ repulsion, and K ⁻ and $ ar K^0$ condensation. ASTRONOMISCHE NACHRICHTEN JCR, v. 336, p. 880-884, 2015.

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MODEL WITH PARAMETERIZED COUPLINGS FOR NEUTRON STARS: THE ROLE OF ANTIKAON CONDENSATES. International Journal of Modern Physics E JCR, v. 20, p. 133, 2011.

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26. doi VASCONCELLOS, C. A. Z. ; HADIJIMICHEF, D. ; SILVA, M. L. L. ; RAZEIRA, M. ; MESQUITA, A. . ENERGY SPECTRA OF GLUINONIUM. INTERNATIONAL JOURNAL OF MODERN PHYSICS E-NUCLEAR PHYSICS JCR, v. 20, p. 200-209, 2011.

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31. doi MARTÍNEZ, AURORA PÉREZ ; ROJAS, HUGO PÉREZ ; PARET, DARYEL MANREZA ; MESQUITA, ALEXANDRE ; RAZEIRA, MOISÉS ; VASCONCELLOS, CÉSAR A. Z. ; GOMES, ROSANA O. ; HADJIMICHEF, DIMITER . A RELATIVISTIC EFFECTIVE MODEL WITH PARAMETERIZED COUPLINGS FOR NEUTRON STARS. International Journal of Modern Physics E JCR , v. 20, p. 230-236, 2011.

32. doi MARTÍNEZ, AURORA PÉREZ ; VASCONCELLOS, CÉSAR A. ZEN ; HADJIMICHEF, DIMITER ; ROJAS, HUGO PÉREZ ; HORVATH, JORGE ; GREINER, WALTER . PREFACE. International Journal of Modern Physics E JCR, v. 20, p. vii-vii, 2011.

33. doi FERNÁNDEZ, F. ; MESQUITA, A. ; RAZEIRA, M. ; VASCONCELLOS, C. A. Z. . THE ROLE OF ANTIKAON CONDENSATES IN THE EQUATION OF STATE OF NEUTRON STARS. International Journal of Modern Physics D JCR, v. 19, p. 1545, 2010.

34. doi MESQUITA, A. ; RAZEIRA, M. ; VASCONCELLOS, C. A. Z. ; FERNÁNDEZ, F. . THE ROLE OF SCALAR-ISOVECTOR MESONS AND ANTIKAONS IN NEUTRON STARS. International Journal of Modern Physics D JCR, v. 19, p. 1549, 2010.

35. doi MESQUITA, A. ; RAZEIRA, M. ; VASCONCELLOS, C. A. Z. ; FERNÁNDEZ, F. . THE ROLE OF ANTIKAON CONDENSATES IN THE ISOSPIN ASYMMETRY OF NEUTRON STARS. International Journal of Modern Physics D JCR, v. 19, p. 1553, 2010.

36. doi BURIGO, L. N. ; BODMANN, B. E. J. ; JACOBSEN, R. B. ; VASCONCELLOS, C. A. Z. ; FERNÁNDEZ, F. . ON THE CONFINED DECONFINED PHASE TRANSITION IN NUCLEAR MATTER AND NEUTRON STARS. International Journal of Modern Physics D JCR, v. 19, p. 1563, 2010.

37. doi ROCHA, A. S. S. ; VASCONCELLOS, C. A. Z. ; FERNÁNDEZ, F. . A FUZZY BAG MODEL FOR NUCLEAR MATTER: A PRELIMINARY APPROACH. International Journal of Modern Physics D JCR, v. 19, p. 1593, 2010.

38. doi DA SILVA, D. T. ; DE QUADROS, J. N. ; DA SILVA, M. L. L. ; VASCONCELLOS, C. A. Z. ; HADJIMICHEF, D. . C3P0 MODEL FOR CHARMED MESONS DECAY. International Journal of Modern Physics D JCR, v. 19, p. 1629, 2010.

39. doi DA SILVA, M. L. L. ; DA SILVA, D. T. ; DE QUADROS, J. N. ; VASCONCELLOS, C. A. Z. ; HADJIMICHEF, D. . GLUEBALL-QUARKONIA MIXTURE IN THE f0(1710) DECAY. International Journal of Modern Physics D JCR, v. 19, p. 1643, 2010.

40. doi GROHMANN, M. ; VASCONCELLOS, C. A. Z. ; MARRANGHELLO, G. F. ; FERNÁNDEZ, F. . HEAVY-ION AND ASTROPHYSICS CONSTRAINTS IN THE PARAMETRIC COUPLING MODEL. International Journal of Modern Physics D JCR, v. 19, p. 1667, 2010.

41. doi RAZEIRA, M. ; MESQUITA, A. ; VASCONCELLOS, C. A. Z. ; FERNÁNDEZ, F. . NATURALNESS, ISOSPIN BREAKING IN NUCLEAR MATTER AND THE OKAMOTO NOLEN SCHIFFER ANOMALY. International Journal of Modern Physics D JCR, v. 19, p. 1743, 2010.

42. doi MARRANGHELLO, GUILHERME F. ; VASCONCELLOS, CESAR A. Z. . HEAVY ION CONSTRAINTS IN THE PARAMETRIC COUPLING MODEL. International Journal of Modern Physics E JCR, v. 19, p. 1935, 2010.

43. doi Menezes, D. P. ; Avancini, S. S. ; Vasconcellos, C. Z. ; RAZEIRA, M. . $ delta$ meson effects in the Nolen-Schiffer anomaly. European Physical Journal A JCR, v. 42, p. 97-103, 2009.

44. doi DEXHEIMER, V. A. ; VASCONCELLOS, C. A. Z. ; BODMANN, B. E. J. . Density dependent nuclear matter compressibility. Physical Review. C, Nuclear Physics JCR, v. 77, p. 065803, 2008.

45. doi VASCONCELLOS, C. A. Z. ; RAZEIRA, M. ; BODMANN, B. E. J. ; MESQUITA, A. . Satability of Neutron Stars with a Large Amount of Strangeness. International Journal of Modern Physics D JCR, v. 16, p. 347-356, 2007.

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52. LÜTZ, EDUARDO ; RAZEIRA, M. ; VASCONCELLOS, C. A. Z. ; BODMANN, B. E. J. ; PILOTTO, F. G. . ISOVECTOR COMPONENTS OF THE SCALAR ?-MESON FAMILY AS NEW INGREDIENTS FOR NUCLEAR MATTER MODELS. International Journal of Modern Physics D JCR, v. 16, p. 325-332, 2007.

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55. JACOBSEN, RAFAEL ; VASCONCELLOS, C. A. Z. ; BODMANN, B. E. J. ; HADIJIMICHEF, D. . ON THE ROLE OF THE ADIABATIC INDEX IN THE STABILITY OF NEUTRON STARS. International Journal of Modern Physics D JCR, v. 16, p. 261-267, 2007.

56. DEXHEIMER, VERÔNICA ; VASCONCELLOS, C. A. Z. ; BODMANN, B. E. J. . THE NUCLEAR MATTER COMPRESSIBILITY FUNCTION IN A PARAMETERIZED COUPLING MODEL. International Journal of Modern Physics D JCR, v. 16, p. 269-275, 2007.

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13. VASCONCELLOS, C. A. Z. ; BODMANN, B. E. J. ; COELHO, H. T. ; HADIJIMICHEF, D. ; GREINER, W. ; STOCKER, H. . IWARA 2005 - 2nd. Int. Workshop on Astronomy and Relativistic Astrophysics. 2005. (Event Production/Congress).
14. VASCONCELLOS, C. A. Z. ; ROCHA, M. A. . XVII Salão de Iniciação Científica da UFRGS. 2005. (Event Production/Congress).
15. VASCONCELLOS, C. A. Z. ; ROCHA, M. A. . XIV Feira de Iniciação Científica da UFRGS. 2005. (Event Production/Congress).
16. VASCONCELLOS, C. A. Z. ; COELHO, H. T. ; GREINER, W. ; STOCKER, H. ; RUFFINI, R. ; PRADO, S. D. . IWARA 2003 - First Int. Workshop on Astronomy and Relativistic Astrophysics. 2003. (Event Production/Congress).
17. ROJAS, H. P. ; VASCONCELLOS, C. A. Z. ; HORVATH, J. . 4rth. Caribbean Workshop on Quantum Mechanics, Particles and Fields. 2003. (Event Production/Congress).
18. VASCONCELLOS, C. A. Z. ; HERSCOVITZ, V. E. ; HADIJIMICHEF, D. ; BODMANN, B. E. J. . Hadron Physics 2002 - 8th. International Workshop on Hadron Physics. 2002. (Event Production/Congress).
19. COELHO, H. T. ; FITTIPALDI, I. P. ; VASCONCELLOS, C. A. Z. . Memento da Astronomia em Pernambuco. 2002. (Event Production/ Other).
20. VASCONCELLOS, C. A. Z. ; HERSCOVITZ, V. E. ; FERREIRA, E. . Hadron Physics 94 - 4th. International Workshop on Hadron Physics. 1994. (Event Production/Congress).

Academic Advisory

Academic Advisory - concluded

Master's Thesis

1. Rafael Bán Jacobsen. 2007. Dissertation (Master's in Physics) - Universidade Federal do Rio Grande do Sul, Conselho Nacional de Desenvolvimento Científico e Tecnológico. *Advisor:* Cesar Augusto Zen Vasconcellos.
2. Verônica Antocheviz Dexheimer. 2006. Dissertation (Master's in Physics) - Universidade Federal do Rio Grande do Sul, Conselho Nacional de Desenvolvimento Científico e Tecnológico. *Advisor:* Cesar Augusto Zen Vasconcellos.
3. Daniel Tavares da Silva. Um Novo Modelo para Decaimentos de Mésons. 2006. Dissertation (Master's in Physics) - Universidade Federal do Rio Grande do Sul, Conselho Nacional de Desenvolvimento Científico e Tecnológico. *Co-Advisor:* Cesar Augusto Zen Vasconcellos.
4. Mário Luiz Lopes da Silva. Uma nova assinatura para glueballs. 2005. Dissertation (Master's in Physics) - Universidade Federal do Rio Grande do Sul, Conselho Nacional de Desenvolvimento Científico e Tecnológico. *Advisor:* Cesar Augusto Zen Vasconcellos.
5. Alberto Sperotto dos Santos Rocha. 2003. 0 f. Dissertation (Master's in Physics) - Universidade Federal do Rio Grande do Sul, Conselho Nacional de Desenvolvimento Científico e Tecnológico. *Advisor:* Cesar Augusto Zen Vasconcellos.
6. Guilherme Frederico Marranghello. Estrutura Nuclear de Estrelas Compactas. 2000. 0 f. Dissertation (Master's in Physics) - Universidade Federal do Rio Grande do Sul, Coordenação de Aperfeiçoamento de Pessoal de Nível Superior. *Advisor:* Cesar Augusto Zen Vasconcellos.
7. André Ribeiro Taurines. 1999. Dissertation (Master's in Physics) - Universidade Federal do Rio Grande do Sul, Conselho Nacional de Desenvolvimento Científico e Tecnológico. *Advisor:* Cesar Augusto Zen Vasconcellos.
8. Alexandre Mesquita. 1998. Dissertation (Master's in Physics) - Universidade Federal do Rio Grande do Sul, Conselho Nacional de Desenvolvimento Científico e Tecnológico. *Advisor:* Cesar Augusto Zen Vasconcellos.
9. Moisés Razeira. 1998. Dissertation (Master's in Physics) - Universidade Federal do Rio Grande do Sul, Conselho Nacional de Desenvolvimento Científico e Tecnológico. *Advisor:* Cesar Augusto Zen Vasconcellos.
10. EDUARDO FERREIRA LUTZ. Estrelas de Nêutrons Em Um Modelo de Walecka Generalizado. 1996. Dissertation (Master's in Physics) - Universidade Federal do Rio Grande do Sul, Conselho Nacional de Desenvolvimento Científico e Tecnológico. *Advisor:* Cesar Augusto Zen Vasconcellos.
11. Fernando Gonçalves Pilotto. 1995. Dissertation (Master's in Physics) - Universidade Federal do Rio Grande do Sul, Conselho Nacional de Desenvolvimento Científico e Tecnológico. *Advisor:* Cesar Augusto Zen Vasconcellos.
12. Johann Gmelch. 1990. 0 f. Dissertation - Universitat Erlangen-Nurnberg (Friedrich-Alexander), Bundes Ministerium Für Forschung

Und Technologie. *Co-Advisor:* Cesar Augusto Zen Vasconcellos.

13. Michael Kautzmann. 1988. 0 f. Dissertation - Universitat Erlangen-Nurnberg (Friedrich-Alexander), Bundes Ministerium Für Forschung Und Technologie. *Co-Advisor:* Cesar Augusto Zen Vasconcellos.

Ph.D. thesis

1. ALEXANDRE MESQUITA. Condensação de Káons em Estrelas de Nêutrons. 2010. Thesis (Ph.D. in Physics) - Universidade Federal do Rio Grande do Sul, Conselho Nacional de Desenvolvimento Científico e Tecnológico. *Advisor:* Cesar Augusto Zen Vasconcellos.

2. MARIO LUIZ LOPES DA SILVA. Um Formalismo para o Decaimento de Mésons Exóticos. 2010. Thesis (Ph.D. in Physics) - Universidade Federal do Rio Grande do Sul, Conselho Nacional de Desenvolvimento Científico e Tecnológico. *Advisor:* Cesar Augusto Zen Vasconcellos.

3. Moisés Razeira. Naturalidade, Quebra de Simetria de Isospin e a Estrutura Interna das Estrelas de Neutrons. 2008. Thesis (Ph.D. in Physics) - Universidade Federal do Rio Grande do Sul, Conselho Nacional de Desenvolvimento Científico e Tecnológico. *Advisor:* Cesar Augusto Zen Vasconcellos.

4. Fernando Gonçalves Pilotto. 2003. 0 f. Thesis (Ph.D. in Physics) - Universidade Federal do Rio Grande do Sul, . *Advisor:* Cesar Augusto Zen Vasconcellos.

5. André Ribeiro Taurines. Comportamento Infravermelho do Propagador do Glúon na Rede. 2003. 0 f. Thesis (Ph.D. in Physics) - Universidade Federal do Rio Grande do Sul, Conselho Nacional de Desenvolvimento Científico e Tecnológico. *Advisor:* Cesar Augusto Zen Vasconcellos.

6. Guilherme Frederico Marranghello. Transição de fase em estrelas de nêutrons e a emissão de ondas gravitacionais. 2003. 0 f. Thesis (Ph.D. in Physics) - Universidade Federal do Rio Grande do Sul, Conselho Nacional de Desenvolvimento Científico e Tecnológico. *Advisor:* Cesar Augusto Zen Vasconcellos.

7. Bernhard Michel. 1992. 0 f. Thesis - Universitat Erlangen-Nurnberg (Friedrich-Alexander), Bundes Ministerium Für Forschung Und Technologie. *Co-Advisor:* Cesar Augusto Zen Vasconcellos.

Scientific Initiation

1. Rafael Bán Jacobsen. 2003. 0 f. Scientific Initiation - Universidade Federal do Rio Grande do Sul, Coordenação de Aperfeiçoamento de Pessoal de Nível Superior. Advisor: Cesar Augusto Zen Vasconcellos.

2. Pedro Castro Menezes Xavier de Mello e Silva. 2003. 0 f. Scientific Initiation - Universidade Federal do Rio Grande do Sul, Conselho Nacional de Desenvolvimento Científico e Tecnológico. Advisor: Cesar Augusto Zen Vasconcellos.

3. Mauricio Grohmann. 2003. 0 f. Scientific Initiation - Universidade Federal do Rio Grande do Sul, Conselho Nacional de Desenvolvimento Científico e Tecnológico. Advisor: Cesar Augusto Zen Vasconcellos.

4. Rafael Bán Jacobsen. 2002. 0 f. Scientific Initiation. (Graduation student in Physics) - Universidade Federal do Rio Grande do Sul. Advisor: Cesar Augusto Zen Vasconcellos.

5. Rafael Bán Jacobsen. 2001. 0 f. Scientific Initiation - Universidade Federal do Rio Grande do Sul, Conselho Nacional de Desenvolvimento Científico e Tecnológico. Advisor: Cesar Augusto Zen Vasconcellos.

6. Alberto Sperotto dos Santos Rocha. 2000. 0 f. Scientific Initiation - Universidade Federal do Rio Grande do Sul, Conselho Nacional de Desenvolvimento Científico e Tecnológico. Advisor: Cesar Augusto Zen Vasconcellos.

7. Rafael Bán Jacobsen. 2000. 0 f. Scientific Initiation - Universidade Federal do Rio Grande do Sul, Conselho Nacional de Desenvolvimento Científico e Tecnológico. Advisor: Cesar Augusto Zen Vasconcellos.

8. Alberto Sperotto dos Santos Rocha. 1999. 0 f. Scientific Initiation - Universidade Federal do Rio Grande do Sul, Conselho Nacional de Desenvolvimento Científico e Tecnológico. Advisor: Cesar Augusto Zen Vasconcellos.

9. Guilherme Frederico Marranghello. 1998. 0 f. Scientific Initiation - Universidade Federal do Rio Grande do Sul, Conselho Nacional de Desenvolvimento Científico e Tecnológico. Advisor: Cesar Augusto Zen Vasconcellos.

10. Alberto Sperotto dos Santos Rocha. 1998. 0 f. Scientific Initiation - Universidade Federal do Rio Grande do Sul, Conselho Nacional de Desenvolvimento Científico e Tecnológico. Advisor: Cesar Augusto Zen Vasconcellos.

11. Guilherme Frederico Marranghello. 1997. 0 f. Scientific Initiation - Universidade Federal do Rio Grande do Sul, Conselho Nacional de Desenvolvimento Científico e Tecnológico. Advisor: Cesar Augusto Zen Vasconcellos.

12. Alberto Sperotto dos Santos Rocha. 1997. 0 f. Scientific Initiation. (Graduation student in Physics) - Universidade Federal do Rio Grande do Sul. Advisor: Cesar Augusto Zen Vasconcellos.

13. Lisiane Diehl. 1996. 0 f. Scientific Initiation - Universidade Federal do Rio Grande do Sul, Conselho Nacional de Desenvolvimento Científico e Tecnológico. Advisor: Cesar Augusto Zen Vasconcellos.

14. André Ribeiro Taurines. 1996. 0 f. Scientific Initiation - Universidade Federal do Rio Grande do Sul, Conselho Nacional de Desenvolvimento Científico e Tecnológico. Advisor: Cesar Augusto Zen Vasconcellos.

15. Antonio Carlos Baretta. 1996. 0 f. Scientific Initiation - Universidade Federal do Rio Grande do Sul, Conselho Nacional de Desenvolvimento Científico e Tecnológico. Advisor: Cesar Augusto Zen Vasconcellos.

16. Guilherme Frederico Marranghello. 1996. 0 f. Scientific Initiation - Universidade Federal do Rio Grande do Sul, Conselho Nacional de Desenvolvimento Científico e Tecnológico. Advisor: Cesar Augusto Zen Vasconcellos.

17. Lisiane Diehl. 1995. 0 f. Scientific Initiation - Universidade Federal do Rio Grande do Sul, Conselho Nacional de Desenvolvimento Científico e Tecnológico. Advisor: Cesar Augusto Zen Vasconcellos.

18. Antonio Carlos Baretta. 1995. 0 f. Scientific Initiation. (Graduation student in Physics) - Universidade Federal do Rio Grande do Sul, Conselho Nacional de Desenvolvimento Científico e Tecnológico. Advisor: Cesar Augusto Zen Vasconcellos.

Alexandre Mesquita. 1994. 0 f. Scientific Initiation - Universidade Federal do Rio Grande do Sul, Fundação de Amparo à Pesquisa 92

19. Estado do Rio Grande do Sul. Advisor: Cesar Augusto Zen Vasconcellos.

20. Antonio Carlos Baretta. 1993. 0 f. Scientific Initiation. (Graduation student in Physics) - Universidade Federal do Rio Grande do Sul, Conselho Nacional de Desenvolvimento Científico e Tecnológico. Advisor: Cesar Augusto Zen Vasconcellos.

21. Antonio Carlos Baretta. 1992. 0 f. Scientific Initiation - Universidade Federal do Rio Grande do Sul, Conselho Nacional de Desenvolvimento Científico e Tecnológico. Advisor: Cesar Augusto Zen Vasconcellos.

Other Relevant Information

Bolsista Senior da CAPES junto ao ICRANet, em Pesacara, Itália e na Universidade La Sapenza, Roma, Itália, de 2014 a 2015..

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Lecturers

Bini Donato

Position: Current
Research Director (permanent position) at
Istituto per le Applicazioni del Calcolo "M. Picone," CNR
Via dei Taurini, 19 I-00185 Roma (IT).

I Scientific Work

The main topic of my interest is General Relativity with special attention to several classical aspects.

In particular, I'm interested in: analysis and interpretation of exact solutions of Einstein's field equations, 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. From 2016 I'm attending the Capra Meetings of the gravitational self-force community and as well as all meeting involving Post-Newtonian approximation, Post-Minkowskian approximation, Effective Field Theory and Effective One-Body approach.

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), year 2016.

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. I've been teaching monographic courses at various Ph.D. schools in Italy.

Work with associate researchers
A Geralico (Istituto per le Applicazioni del Calcolo "M. Picone," CNR, Rome, Italy)

III Service activities
Scientific collaboration with:
Prof. R.T. Jantzen (Villanova Univesity, USA and ICRANet);

Outside ICRANet
Scientific collaboration with:
Prof. T. Damour (IHES, Paris, France).
Dr. G. Esposito (INFN, Napoli, 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 2017, 2018 and 2019 I've been awarded as **Outstanding Referee** from the journal Classical and Quantum Gravity (IOP).
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*

2020 List of publications

1) Bini D. Damour T. and Geralico A.
Scattering of tidally interacting bodies in post-Minkowskian gravity,
Phys. Rev. D **101**, no. 4, 044039 (2020)
DOI:10.1103/PhysRevD.101.044039
e-Print: arXiv:2001.00352 [gr-qc].

2) Bini D., Geralico A. Jantzen R. T., Plastino W.,
Godel spacetime, planar geodesics and the Mobius map
Gen Relativ Gravit **52**, 73 (2020)
doi: doi.org/10.1007/s10714-020-02731-w
e-print: arXiv:2002.11432 [gr-qc].

3) Rettegno P., Martinetti F., Nagar A., Bini D., Riemenschneider G., and Damour T.
Comparing effective One Body Hamiltonians for spin-aligned coalescing binaries
Physical Review D , **101**, No. 10 (2020)
DOI: 10.1103/PhysRevD.101.104027
e-Print: arXiv:1911.10818 [gr-qc].

4) Bini D. and Esposito G.,
New solutions of the Ermakov-Pinney equation in curved spacetime
General Relativity and Gravitation, **52**, No. 60, 2020
doi: 10.1007/s10714-020-02713-y
e-Print: arXiv:1912.01869 [gr-qc].

5) Bini D., Geralico A. and Steinhoff J.,
Detweiler's redshift invariant for extended bodies orbiting a Schwarzschild black hole
Phys. Rev. D, **102**, 024091, (2020)
doi: 10.1103/PhysRevD.102.024091
e-print: arXiv:2003.12887 [gr-qc].

6) Bini D., Damour T. and Geralico A.,
Binary dynamics at the fifth and fifth-and-a-half post-Newtonian orders
Phys. Rev.D, **102**, 024062 (2020)
e-print: arXiv:2003.11891 [gr-qc].

DOI: 10.1103/PhysRevD.102.024062
Appeared as Editor Suggestion paper

7) Bini D., Damour T. and Geralico A.
Sixth Post-Newtonian local-in-time dynamics of binary systems
Phys. Rev. D, **102**, 024061 (2020)
e-print: arXiv:2004.05407 [gr-qc].
DOI: 10.1103/PhysRevD.102.024061
Appeared as Editor Suggestion paper

8) Bini D., Damour T. and Geralico A.
Sixth post-Newtonian nonlocal-in-time dynamics of binary systems
Phys. Rev. D, **102**, no.8, 084047 (2020)
e-print: arXiv:2007.11239 [gr-qc, hep-th].
DOI: 10.1103/PhysRevD.102.084047

9) Salucci P, et al.,
When Planck, Einstein and Vera Rubin Meet. Dark Matter: What is it? Where is it?
Frontiers in Astronomy and Space Sciences, to appear 2020
[White Paper of the INFN collaboration QGSKY]
arXiv:2011.09278

Surname Name: **Sang Pyo Kim** **Photo** 

Position: Professor, Kunsan National University, Visiting professor at Institute of Theoretical Physics, CAS, China
Period covered: 2019.01.01-2019.12.31

I Scientific Work

:Applied quantum field theory to cosmology and black holes to handled issues such as (i) QED action in de Sitter space and magnetogenesis (ii) charged black holes for gamma rays and gravitational waves.

:Formulated nonperturbative approach to quantum field theory in curved spacetimes or electromagnetic backgrounds and studied Schwinger effect and its applications.

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

(i) Seminar at ICRANet, “Magnetars, Magnetized Black Holes and Laboratory Astrophysics” Sept. 12, 2019

(ii) Collaboration with She-Sheng Xue, Ehsan Bavasard and Clement Stahl on “QED action in de Sitter space”

(iii) Meeting (Prof. Ruffini, Vereshchagin) with Prof. Gerard Mourou on Sept. 16, 2019 at Isola d’Elba

III b. Outside ICRANet

(i) AAPPS-DACG Workshop on Astrophysics, Cosmology and Gravitation at APCTP, November 9-13, 2020, local chair

(ii) “Primordial Black Holes with Charges,” invited talk at RUSGRAV17 (June 29-July 3, 2020)

IV. Other

(i) 2021.1-2023.12: Chair, DACG (Division of Astrophysics, Cosmology and Gravitation), AAPPS (Association of Asia Pacific Physics Societies)

(ii) 2020.1-2022.12: President, APCosPA Org (Asia Pacific Cosmology and Particle Astrophysics Organization)

(iii) 2019.2-2020.2: Visiting Professor of ITP (Institute of Theoretical Physics), CAS (Chinese Academy of Sciences)

2020List of Publication

(i)L. Liu, O. Christiansen, Z-K. Guo, R-G. Cai and S. P. Kim, “Gravitational and Electromagnetic Radiations from Binary Black Holes with Electric and Magnetic Charges: I. Circular Orbits on a Cone” Phys.Rev.D 102 (2020) 103520

(ii)L. Liu, Z-K. Guo, R-G. Cai and S. P. Kim,“Merger rate distribution of primordial black hole binaries with electric charges” Phys.Rev.D 102 (2020) 043508

(iii)R-G. Cai, C-M. Chen, S. P Kim and J-R. Sun, “Schwinger effect in near-extremal charged black holes in high dimensions” Phys.Rev.D 101 (2020) 105015.

(iv) C-M. Chen and S. P Kim, “Schwinger Effect from Near-extremal Black Holes in (A)dS Space” Phys.Rev.D 101 (2020) 085014.

Research Scientists

Visiting Scientists

Lecian Orchidea Maria

Photo

Position: Postdoctoral Researcher, Professor.

Sapienza University of Rome,
Faculty of Medicine and Psychology,
Via dei Marsi, 78-00185 Rome, Italy.
Full Professor: Applied Physics.

Sapienza University of Rome,
Faculty of Medicine and Psychology,
Piazzale Aldo Moro, 5-00185 Rome, Italy.
Full Professor: Mathematics and Fundamentals of Computer Science.

Period covered:

2020

I Scientific Work

Research in Theoretical Physics, General Relativity, Quantum Gravity, Mathematics, Applied Chemistry.

II Conferences and educational activities
II a Conferences and Other External Scientific Work

Seminars

O.M. Lecian: Technicalities about the LHAASO experiment, VIA Astroparticle Physics Forum Seminar COSMOVIA, 28 March 2020, Paris, France.

Conferences

Mini-Course: An Introduction to Quantum Field Theory in Curved Spacetime, 12-16 October 2020: , London Mathematical Society webinar, London, UK.

Optics2020- Optics Virtual 2020 Theme: To disseminate knowledge on Lasers, Photonics and Optics Technologies, Talk: Optics, Optical systems, further theoretical implementations of the optical Equivalence principle and spectral analyses, September 24-25, 2020 , Herndon, VA USA.

The Fourth Zeldovich virtual meeting, Talk: Specific aspects of the evolution of antimatter globular cluster domains, September 7-11, 2020, Pescara, Italy.

2020 International Conference on New Energy, Power and Environmental Engineering (NEPEE2020), Reviewer, 20-21 December 2020, Xiamen, China.

2020 International Workshop on Intelligent Computing, Communication and Data Engineering (ICCDE2020), Techinical Program Commitee Member and Reviewer, 22-23 November 2020, Beijing, China.

2020 2nd International Conference on Biotechnology and Medical Engineering (ICBME2020), Technical Committee Member, 22-23 November 2020, Beijing, China.

International Conference on Physics, Organizing Committee Member, October 19-21, 2020, Rome, Italy.

5th International Conference on Geology and Earth Science, Organizing Committee Member, August 3-4, 2020, Paris, France.

2020 Asia-Pacic Conference on Applied Mathematics and Statistics (AMS 2020), International Technical Committee, Feb 17-19, 2020, Sydney, Australia.

II b Work With Students

II c Diploma thesis supervision

II d Other Teaching Duties

Professorship, Full Professor: Applied Physics, Sapienza University of Rome, Rome, Italy.

Professorhip, Full Professor: Mathematics and Fundamentals of Computer Science, Sapienza University of Rome, Rome, Italy.

VIA Astroparticle Physics Forum Lecture COSMOVIA,O.M. Lecian: About Fractons: further investigations- several models, 20 June 2020, Paris, France.

VIA Astroparticle Physics Forum Lecture COSMOVIA, O.M. Lecian: About Fractons- further investigations, 06 June 2020, Paris, France.

VIA Astroparticle Physics Forum Lecture COSMOVIA, O.M. Lecian: Some aspects of Fractons. 30 May 2020, Paris, France.

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

Conferences

FORUM PA 2020- Innovation and digital transformation as a response to the crisis (Innovazione e trasformazione digitale come risposta alla crisi), Sapienza online webinar, Rome, Italy.

IV. Other

Editor

Galaxies MDPI, Special Issue "Galaxies Observation and Theoretical Features"

Associate Editor

Open Access Journal of Engineering Sciences.

Editorial Board Committee Member

JPAA- Journal of Physics and Advanced Applications.

Editorial Board Member

SCIREA Journal of Mechanical Engineering

The Open Conference Proceedings Journal

The Open Mathematics, Statistics And Probability Journal, Editorial Board Member.

Referee

Classical and Quantum Gravity

Journal of Scientific Research and Reports

Journal of Energy Research and Reviews

Physical Science International Journal

Journal of Engineering Research and Reports

International Astronomy and Astrophysics Research Journal

Advances in Research

Mathematics MDPI

Galaxies MDPI

Applied Sciences MDPI

Symmetry MDPI

Molecules MDPI

2020 4th International Conference on Electrical, Automation and Mechanical Engineering (EAME2020)

2020 International Conference on Electronics, Automation and Communication Engineering (EACE2020)

AMS 2021- 2021 Asia-Pacific Conference on Applied Mathematics and Statistics

2020 International Conference on New Energy, Power and Environmental Engineering

(NEPEE2020)

2020 International Workshop on Intelligent Computing, Communication and Data Engineering (ICCDE2020)

AMS 2020- 2020 2nd Asia-Pacific Conference on Applied Mathematics and Statistics

2020 List of Publication

OML, A More Suitable Definition of Quadratic Surds, The Open Mathematics, Statistics and Probability Journal- 10, 8-20 (2020).

OML, Estimations of the Optical Equivalence Theorem for Opto-Mechanical Systems for Investigation in General Relativity and High-Energy Physics, Computation 8(3), 60 (2020).

A.A. Kirillov, OML, E.P. Savelova, Scattering of GWs on wormholes: foreshadow and afterglow/echoes from binary merge?, arXiv:2003.13127 [gr-qc] (2020).

Surname Name

Photo

LIN Wenbin

Position: Professor, PhD supervisor, University of South China
Period covered: 2018.01-present

Position: Professor, PhD supervisor, Southwest Jiaotong University
Period covered: 2009.10 -present

I Scientific Work

1. The qusi-Keplerian motion in post-Newtonian approximations
2. Frequency shift/time delay in the gravitational fields
3. Deep learning for gravitational wave signals.

II Conferences and educational activities

II a Conferences and Other External Scientific Work

II b Work With Students

Supervising4 PhD students and 9 master students on the fields of general relativity and gravitation, deep learning

II c Diploma thesis supervision

Bo Yang,ANALYTICAL SOLUTION OF THE TEST PARTICLE'S MOTION IN THE POST-NEWTONIAN APPROXIMATION, PhD thesis

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 activities: Introduction for Applied Physics, Applied software Practice

IV. Other

2019-2020List of Publication

1. H. Nakajima, **W. Lin***, "Chandrasekhar-like transformations for electromagnetic and scalar waves in Schwarzschild spacetime",*Class. Quantum Grav.*, 38, 027001 (2021).
2. B. Yang, **W. Lin***, "The second post-Newtonian motion in Schwarzschild spacetime", *Gravit. Cosmo.*, 26, 373 (2020).
3. G. He*, X. Zhou, Z. Feng, X. Mu, H. Wang, W. Li, C. Pan*, **W. Lin***, Gravitational deflection of massive particles in Schwarzschild-de Sitter spacetime, *Eur. Phys. J.* C, 80, 835 (2020).
4. B. Yang, **W. Lin***, "Quasi-Keplerian motion under the generally parameterized post-Newtonian force", *Gen. Relativ. Gravit.*, 52, 49 (2020).
5. B. Yang, **W. Lin***, "A new formulation of quasi-Keplerian motion under the generally parameterized post-Newtonian force", *Eur. Phys. J.* Plus., 135, 137 (2020).
6. H. Luo,**W. Lin***, Z. Chen, Q Huang, "Extraction of Gravitational Wave Signals with Optimized Convolutional Neural Networks", *Front. Phys.*, 15, 14601 (2020).
7. A. Raza, **W. Lin***, Y Chen, Y. Zhang, H. Chattha, A Sharif, "Wideband tapered slot antenna for applications in ground penetrating radar", *Microwave & Opt. Tech. Lett.*, First published on 06 March 2020.
8. B. Yang, **W. Lin***, "Post-Keplerian motion in Reissner-Nordström spacetime", *Gen. Relativ. Gravit.*, 51, 116 (2019).
9. X. Zhu, B. Yang, C. Jiang, **W. Lin***, "Parameterized post-post-Newtonian light propagation in the field of one spherically-symmetric body", *Commun. Theor. Phys.*, 71, 1455 (2019).
10. G. He, C. Pan, **W. Lin***, "Velocity Effects on Second order Contributions to Gravitational frequency shift by a moving Kerr-Newman black hole", *Eur. Phys. J.* C. 79, 705 (2019).
11. B. Yang, C. Jiang, **W. Lin***, "Post-Minkowskian solution for the small-deflection motion of test particles in Kerr-Newman spacetime", *Class. Quantum Grav.*, 36, 085010 (2019).
12. L. Wang, M. Yang, **W. Lin***, "Effects of resonant magnetic perturbation on the instability of single tearing mode with non-shear flow", *Chin. Phys.* B 28, 015203 (2019).
13. A. Raza, **W. Lin***, Y. Liu, A. Sharif, Y. Chen, "A magnetic-loop based monopole antenna for GPR applications", *Microwave & Opt. Tech. Lett.*, 61:1052 (2019).

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

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

Teaching in Kyungpook National University, KOREA: Astrophysics 1, Advanced Astrophysics 1

IV. Other

2019-2020 List of Publication

Yun Hee Lee, Hong Bae Ann, and Myeong-Gu Park, Bar Fraction in Early- and Late-Type Spirals, The Astrophysical Journal 872(1):97 (18pp) (2019.02.14)

Byeong-Cheol Lee, Myeong-Gu Park, Inwoo Han, Tae-Yang Bang, Hyeong-Il Oh, Yeon-Ho Choi, A Search for Exoplanets around Northern Circumpolar Stars VI. Detection of planetary companions

orbiting the giants HD 60292 and HD 112640, Journal of the Korean Astronomical Society 53(1):27-34 (2020.02)

Tae-Yang Bang, Byeong-Cheol Lee, V. Perdelwitz, GwanghuiJeong, Inwoo Han, Hyeong-Il Oh, Myeong-Gu Park, Hybrid star HD 81817 accompanied by brown dwarf or substellar companion, Astronomy & Astrophysics 638:A148-6 (2020.6.30)

Yun Hee Lee, Myeong-Gu Park, Hong Bae Ann, Taehyun Kim, Woo-Young Seo, Bar Classification Based on the Potential Map, The Astrophysical Journal 899(1):84 (22pp) (2020.08.10)

Surname Name

Photo

Klaudio Peqini

Position: Visiting Researcher
Period covered: 16 September – 30 September 2018

I Scientific Work (before 2020)

1. 05.2015 Duka B., **Peqini K.**, De Santis A., Pavon-Carrasco F.J., 2015. Using "domino" model to study the secular variation of the geomagnetic dipolar moment. Phys. Earth. Planet. Inter. 242, 9–23. **Impact factor: 2.480.**http://dx.doi.org/10.1016/j.pepi. 2015.03.001

2. 09.2015 **Peqini K.**, Duka B., De Santis A., 2015. Insights into pre-reversal paleosecular variation from stochastic models. Front. Earth Sci. 3:52. doi: 10.3389/feart.2015.00052. **Impact factor: 1.970.**

3. 01.2016 **Peqini K.**, Duka B., 2016. Insights into reversals mechanism of the geomagnetic field through stochastic models simulations. Proceedings Book of The International Physics Conference Tirana 2015. https://sites.google.com/site/albanian physics2015/

4. 06.2016 Duka B., Duka E., **Peqini K.**, 2016. Recovering external contribution from the monthly mean series of a given geomagnetic observatory. ANNALS OF GEOPHYSICS, 59, 3, G0321; doi:10.4401/ag-6971. **Impact factor: 1.374.**

5. 07.2017 **Peqini K.**, Duka B., 2017. Statistical Indicators as Potential Early Signals of Transitions in Time Series Obtained by a Statistical Model: Geomagnetic Field Case. Proceedings book of the International Conference on Applied Statistics and Econometrics (ICASE 2017) 27-28 April 2017 Tirana, Albania. http://icase.epoka.edu.al/2017/category- proceedings-1729.html

6. 03.2018 **Peqini K.**, Duka, B., Dominici, G., 2018. Crustal field recovery and secular variation from regional and global models over Albania. ANNALS OF GEOPHYSICS, 61, 1, GM101, 2018. doi: 10.4401/ag-7419 **Impact factor: 1.374.**

7. 03.2018 **Peqini K.**, Duka B., 2018. Statistical indicators as potential early signals of transitions in time series obtained by a statistical model: geomagnetic field case. International Journal of Applied Statistics and Econometrics (IJASE) doi: 10.26384 /IJASE1807 https://esa.org.al/volume-1/

8.09.2018 **Peqini K.**, Duka B., Egli R., Leichter B., 2018. Crustal geomagnetic field and secular variation by regional and global models for Austria. **111, 1, 048–063. doi: 10.17738/ajes.2018.0004 Impact factor: 1.034.**

9.12.2018 **Peqini K.**, Duka B., 2018. Core-Mantle Boundary Velocity Field Recovering From a Four-Century Geomagnetic Field Model. JNTS (Journal of Natural and Technical Sciences), 46 (XXIII), 3–

18.

10. 02.2019 **Peqini K.**, Duka B., 2019. The velocity field at the Earth's core–mantle boundary. AIP Conference Proceedings **2075**, 120026; Published Online: 26 February 2019; https://doi.org/10.1063/1.5091284

11. 11.2019 **Peqini K.**, Duka B., 2019. Small-scale velocity field at the Core-Mantle Boundary constructed from the gufml global model. AIP Conference Proceedings **2178**, 030007; Published Online: 25 November 2019; https://doi.org/10.1063/1.5135405

12. 12.2019 Luga E., **Peqini K.**, 2019. The Influence of Oxide Content on the Properties of Fly Ash/Slag Geopolymer Mortars Activated with NaOH. Periodica Polytechnica Civil Engineering, 63 (4), pp 1217–1244. https://doi.org/10.3311/PPci.14381**Impact factor: 0.905.**

II Conferences and educational activities

II a Conferences and Other External Scientific Work

1. 05.2013 Participant in the 4th seminar on parallel systems and programming organized on 30 May 2013 close in the Center for Research and Development of the Faculty of Information Technology, Polytechnic University of Tirana (UPT), as part of the European project FP7 HP-SEE.

2. 05.2014 **K. Peqini** and B. Duka: "Applying "domino" model to study dipolar geomagnetic field reversals and secular variation". Poster presentation in the annual conference of EGU held in Vienna (27 April-2 May 2014).

3. 04.2015 **K. Peqini** and B. Duka: "Comparison of the dipolar magnetic field generated by two Ising-like models". Poster presentation in the annual conference of EGU held in Vienna (12-17 April 2015).

4. 06.2015 E. Filippi, A. De Santis, F. J. Pavon-Carrasco, B. Duka, **K. Peqini**: "Some evidence for a Turbulent Diffusion in the Geodynamo from geomagnetic global models of the last few millennia". Poster presentation in the IUGG Conference 2015 held in Prague (22 June-2 July 2015).

5. 11.2015 **K. Peqini** and B. Duka: "Insights into reversals mechanism of the geomagnetic field through stochastic models simulations". Oral presentation in The International Physics Conference held in Tirana (13-14 November 2015).

6. 04.2016 **K. Peqini** and B. Duka: "Recovering the crustal and unmodelled external contributions to the geomagnetic field of the European area". Oral presentation in the annual conference of EGU held in Vienna (17-22 April 2016).

7. 09.2016 **K. Peqini**: Recent results on recovering the non-modeled external magnetic field and crustal magnetic field from the confrontation of regional and global models of the geomagnetic field. Oral presentation in **The Second International Workshop on recent LHC results and related topics held in Tirana (26-27 September 2016).** https://indico.cern.ch/event/561738/

8. 04.2017 **K. Peqini** and B. Duka: "**Geomagnetic Crustal field Anomalies over small countries (Austria and Albania) according to regional and global models**". Poster presentation in the annual

conference of EGU held in Vienna (23-28 April 2017).

9. 04.2017 **K. Peqini**, B. Duka and A. Uka: "Statistical indicators as potential early signals of transitions in time series obtained by a statistical model: Geomagnetic field case". **Oral presentation at the 1st International Conference on Applied Statistics and Econometrics (ICASE) 2017, held at Epoka University (27-28 April 2017).**

10. 09.2017 B. Duka and **K. Peqini**: "Regional geomagnetic field modeling". Oral presentation at the XII Annual Meeting of ALBSHKENCA, Prishtina, Kosovo (01-03 September 2017).

11. 11.2017 **K. Peqini** and B. Duka: "Time variation of the velocity field in core-mantle boundary (CMB)". National conference KSNTEK, Tirana, 17-18 November, 2017.

12. 04.2018 K. Peqini, B. Duka and B. Leichter: "Jerks and the velocity field at the CMB recovered using gufm1 model". Poster presentation in the annual conference of EGU held in Vienna (08-13 April 2018).

13. 08.2018 **K. Peqini** and B. Duka: "The Velocity Field at the Earth's Core-Mantle Boundary". Oral presentation in the BPU (Balkan Physics Union) 10th Conference held in Sofia, Bulgaria (26-30 August, 2018).

14. 10.2018 **K. Peqini**: "Flow at the Core-Mantle Boundary and Jerks". Oral presentation in the III International Workshop on recent LHC Physics results and related topics held in Tirana, Albania (10-12 October 2018).

15. 04.2019 **K. Peqini**, M. Ifti and B.Duka: "Statistical and Hurst Analysis of Palaeomagnetic Data". Poster Presentation in the annual conference of EGU held in Vienna (07-12 April 2019).

16. 05.2019 **K. Peqini**: "Velocity field at the core-mantle boundary and jerks". Oral presentation in the First International Conference on Research, Application and Educational Methods, RAEM, held in Korça, Albania, 24 May 2019.

17. 07.2019 **K. Peqini** and B. Duka: "Small-scale velocity field at the core-mantle boundary constructed from the gufm1 global model". Oral presentation in the 35th International Physics Congress of the Turkish Physical Society, held in Bodrum, Turkey, 03-08 September 2019.

18. 11.2019 **K. Peqini**, M. Ifti and S. Miço: "Hurst exponent and magnitude distribution from palaeomagnetic and model generated time series". Oral presentation in the 1st International Conference on Applied Physics (ICAP), held in Tirana, Albania, 20-22 November 2019.

19. 11.2019 S. Miço, M. Ifti, P. Dhoqina, D. Prenga, **K. Peqini**: "Statistical properties of time series of air pollutants and meteorological data". Oral presentation in the 1st International Conference on Applied Physics (ICAP), held in Tirana, Albania, 20-22 November 2019.

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

I have been teaching various courses at the Department of Physics ofthe Faculty of Natural Sciences of Tirana University. These courses range from General Physics (Mechanics, Electromagnetism) to courses in Theoretical Physics (Analytical Mechanics, Introductory Classical Electrodynamics and Introductory Statistical Physics)

IV. Other

Below is given a list of the scientific projects that I have been member of:

1. 2012-2014 Participant in the project: "Study of the stability of fluid dynamic systems in cylindrical and spherical geometry", project included in the Executive Program of Scientific and Technological Cooperation between Albania and Italy, for the years 2012 – 2014.

2. 2013-2015 Participant in the project: "Numerical experiments on the natural convection of the fluids between coaxial cylinders and concentric spheres (NUM-EXP-NAT-CONV)", a winning project of "hp-see-pilot-call-awarded- applications" (High Performance Computing in South East Europe).

3. 2013-2014 Participant in the project: "Numerical simulations of natural convection in cylindrical cavities and the determination of the indicators of critical phenomena in the time series of the geomagnetic field variation", funded by the Faculty of Natural Sciences, University of Tirana.

4. 2014-2015 Participant in the project: "Optimization and Scalability testing of a new OpenFoam application". Field of research is: Engineering an Energy Sources.

5. 2015-2017 Participant in the project: "Using ground and satellite data to study the variations of the geomagnetic field over Austria and Albania". This Project is in collaboration between University of Tirana and ZAMG (ZentraleAnstaltfürGeophysik und Geodynamik) Vienna, Austria.

2020 List of Publication

1. 02.2020 MIÇO S., PEQINI K., IFTI M., DHOQINA P., PRENGA D., 2020. Statistical properties of time series of air pollutants and meteorological data. Proceedings book of ICAP Conference; Published online: 28 February 2020.

2.05.2020 Muceku Y., Leka V., **Peqini K.**, Goskolli E., Jaupaj O., 2020. GROUND SUBSIDENCE TRIGGERED BY MINING ACTIVITY IN URBAN AND RURAL AREAS OF ALBANIA,

ANALYSIS AND GEOENVIRONMENTAL IMPACTS. JNTS (Journal of Natural and Technical Sciences), 49 (XXIV), 49–72.

Surname Name **Riahi, Rashid**

Position:
Assistant Professor
Department of Science, Shaherkord Branch, Islamic Azad University, Shahrekord, Iran
Period covered:

2003-

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

[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 in Shahrekord Branch, Islamic Azad University

IV. Other

2019 List of Publication

Riahi, R., Kalantari, S.Z. and Rueda, J.A., 2019. Universal relations for the Keplerian sequence of rotating neutron stars. *Physical Review D*, *99*(4), p.043004.

Riahi, R. and Kalantari, S.Z., 2020. Properties of Rotating Neutron Star in Density-dependent Relativistic Mean-field Models. *arXiv preprint arXiv:2012.03232*.

Personal Data

Name	**Soroush Shakeri**
Date of Birth	14/07/1988
Address	***Department of Physics, Isfahan University of Technology, Isfahan 84156-83111, Iran***
Telephone	+98 09387106317
E-mail	s.shakeri@iut.ac.ir
Place of Birth	**Ahvaz,Iran**

Current Position :
Assistant Professor at Isfahan University of Technology (IUT)
The Head of ICRANet-Isfahan

Scientific Area

- **Gamma Ray Bursts (GRBs)**

Data analysis and their phenomenological aspects-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; Circular polarization of GRB from different types of interaction such as photon-photon, photon-graviton, photon-axion and ..Gravitational waves from Short Gamma Ray Bursts (SGRBs) and its impact on their electromagnetic signals

- **Strong Field QED Phenomena**

Strong field QED phenomena in astrophysics medium (Pulsars and GRBs) and Ground Based Laser Experiments , Phenomenology of particle interactions in the strong field regimes.

- **Pulsar Physics**

Nonlinear QED interactions in pulsar's magnetosphere, Investigation the impact of light by light scattering in X-ray emission of pulsars, Dark matter detection using Pulsar Timing Array (PTA)

- **Axion Dark Matter**

Light by Light Scattering as a Probe for Axion Dark Matter
,Cavity Search for Axion Dark Matter,Axion-photon interaction and its impact on CMB polarization

- **Early Universe Cosmology**

Circular polarization of CMB from primordial perturbations and fundamental interactions, QCD phase transition and its cosmological consequences in the early Universe, Particle pair production in the early universe, Schwinger-pair production in the inflationary models

List of Publications Inside ICRANet-Isfahan 2020

Shedding New Light on Sterile Neutrinos from XENON1T Experiment,
Soroush Shakeri, Fazlollah Hajkarim, She-Sheng Xue, **JHEP12(2020)194 , [arXiv:**2008.05029 **]**

List of Papers Under Review Inside ICRANet 2020

Probing Virtual Axion-Like Particles by Precision Phase Measurements, Moslem Zarei, Soroush Shakeri, Mehdi Abdi, David J. E. Marsh and Sabino Matarrese, [arXiv:1910.09973]

Light by Light Scattering as a Probe for Axion Dark Matter, Soroush Shakeri, David J. E. Marsh , and She-Sheng Xue, [arXiv:1910.09973]

Organizing Scientific Meeting ICRANet-Isfahan Webinar 2020

Virtual Meeting of World Astronomy Week (ICRANet and IUT), 2020, May 7th

List of presentations 2020

Towards the Detection of Axion Dark Matter,
Soroush Shakeri, 23th Meeting on research in astronomy, Instituted for Advanced Studies in Basic Sciences, Zanjan, IRAN, 8-9 May 2020.

Towards the Detection of Axion Dark Matter,
Soroush Shakeri, Weekly webinar at Department of Physics-Isfahan University of Technology-2020/06/13

Service Activities Outside ICRANet 2020,

Teaching subjects in Isfahan University of Technology,

Elementary Particle Physics (Undergraduate)
Analytic Mechanics (Undergraduate)
General Physics (Undergraduate)

List of Publications Inside ICRANet before 2020

Nonlinear QED Effects in X-ray Emission of Pulsars , S. Shakeri, M. Haghighat and She-Sheng Xue, **JCAP 1710 (2017) no.10, 014** , [arXiv:1704.04750]

Polarization of a Probe Laser Beam due to the Nonlinear QED Effects. Soroush Shakeri, Seyed Zafarollah Kalantari, She-Sheng Xue. 2017. 10 pp. Published in **Phys.Rev. A95 (2017) no.1, 012108**.

"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***. Astrophys.J. 833 (2016) no.2, 159*** [arXiv:1610.05619]

``***X-ray Flares in Early Gamma-ray Burst Afterglow''*** R. Ruffini, Y. Wang, Y. Aimuratov, L. Becerra, C.L.Bianco, 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**,Astrophys.J. 852 (2018)no.1, 53** [arXiv:1704.03821]

The binary systems associated with short and long gamma-ray bursts and their detectability, Jorge Rueda, Y. Aimuratov, U. Barres de Almeida, L. 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. ***Int.J.Mod.Phys. D26 (2017) no.09, 1730016***

The cosmic matrix in the 50th anniversary of relativistic astrophysics ,R. Ruffini, Y. Aimuratov , L. 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, ***Int.J.Mod.Phys. D26 (2017) no.10, 1730019***

What can we learn from GRBs? Marco Muccino , Remo Ruffini, Yerlan Aimuratov, Laura M. Becerra, Carlo L. Bianco, Mile Karlica, Milos Kovacevic, Julio D.Melon Fuksman, Rahim Moradi , Ana V. Penacchioni , Giovanni B. Pisani, Daria Primorac , Jorge A. Rueda, Soroush Shakeri, Gregory V. Vereshchagin, She-Sheng Xue, Yu Wang **EPJ Web Conf. 168 (2018) 01015**

Revisiting the Statistics of X-ray Flares in Gamma-ray Bursts, Y. Wang, Y. Aimuratov , R. Moradi , M. Peresano, R. Ruffini, S. Shakeri, **THESEUS Workshop 2017,05-06 Oct 2017.** Naples, Italy [arXiv: 1802.01693]

Relativistic Behavior and Equitemporal Surfaces in Ultra-Relativistic Prompt Emission Phase of Gamma-Ray Bursts, Moradi, R.; Ruffini, R.; Bianco, C. L.; Chen, Y.-C.; Karlica, M.; Melon Fuksman, J. D.; Primorac, D.; Rueda, J. A.; Shakeri, S.; Wang, Y.; Xue, S. S. **Astronomy Reports**, Volume 62, Issue 12, pp.905-910, 2018

List of Publications Outside ICRANet before 2020

Circularly Polarized EM Radiation from GW Binary Sources. Soroush Shakeri, Alireza Allahyari, Published in ***JCAP11(2018)042*****,** [arXiv:1808.05210]

Schwinger Effect in Anisotropic Inflation, Soroush Shakeri, Mohammad Ali Gorji and Hassan Firouzjahi,[arXiv:1903.05310] **Phys. Rev. D 99, 103525 (2019)**

List of presentations

*"**Analysis the phase diagram of QCD and prediction of 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.*

***"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, Italy*

Oral Talk : "Afterglow: from synchrotron emission to polarization characteristics "** Fourth Bego Rencontres -IRAP Ph.D. Erasmus Mundus school, May 30th - June 3rd, 2016,Villa Ratti, Nice-France **Soroush Shakeri.

Oral Talk: "Nonlinear QED effects : From GRBs to High power lasers"** Supernovae, Hypernovae and Binary Driven Hypernovae" Adriatic Workshop-Pescara-Italy- June 20-30, 2016**-Soroush Shakeri.

Oral Talk : Strong-Field QED Processes: From High Power Lasers to Pulsars,** Department of Physics Shahid Beheshti University (SBU), Tehran, Iran. **December 9, 2017

***Oral Talk : Polarization as a test for fundamental physics,** School of Astronomy of Institute of research in fundamental sciences (IPM), Tehran, Iran, December 13, 2017*

Oral Talk : Probing the vacuum structure from astrophysical objects to ground based laboratories, Department of Physics Sharif University of Tehran (SUT), March 3, 2018

***Oral Talk : Probing the vacuum structure from astrophysical objects to ground based laboratories,** July 3, 2018, Fifthteenth Marcel Grossmann Meeting, Rome, Italy*

***Oral Talk : Probing Magnetic Field Configuration oF GRBs and afterglow from the polarized Emission**, July 6 Fifthteenth Marcel Grossmann Meeting, Rome, Italy*

Oral Talk : **Light by Light Scattering as a Probe for Axion Dark Matter,** Soroush Shakeri,15th Patras Workshop on Axions, WIMPs and WISPs, 2019, 3-7 June, Frieburg Germany

Curriculum Vitae
Prof. Donato Giorgio Torrieri

Contents

1 Basics

Current Status
Professor 3.2, DRCC, IFGW, Unicamp
Tenured (Estabilidade) since 2016
Tel. +551935215548 email: torrieri@ifi.unicamp.br

Education

- Abilitazione Scientifica Nazionale, Bando D.D. 1532/2016 SETTORE CONCORSUALE 02/A2 "FISICA TEORICA DELLE INTERAZIONI FONDAMENTALI" (2018-2020)
- Livre Docencia (University Habilitation of the state of Sao Paulo), obtained 16/12/2019 from Unicamp
- Alexander Von Humboldt fellowship, Frankfurt, Germany
- Tomlinson Fellowship, McGill University, Canada
- May 2004: Ph.D, Physics, University of Arizona
  (Adviser: Prof. Jan Rafelski, rafelski@physics.arizona.edu)
  Title: *Statistical hadronization phenomenology in heavy ion collisions at SPS and RHIC energies*
  Dissertation available online at `http://arxiv.org/abs/nucl-th/0405026`
  official copy at
  `http://arizona.openrepository.com/arizona/bitstream/10150/280537/1/azu$_$td$_$3131644$_$sip`
- December 1999: M.Phil by Research, University of Birmingham
  (Adviser: John Kinson, jbk@hep.ph.bham.ac.uk).
  Thesis Title: *Strangeness enhancement in heavy ion collisions at the WA97 experiment*
  Thesis available on the web at
  http://www.ep.ph.bham.ac.uk/publications/thesis/gdt_thesis.ps.gz
- June 1997: M.Phys, University of Oxford.
  Specialization in Particle and Theoretical Physics, 2:1 Honors
- June 1994: Moderations in Mathematics, University of Oxford (Oriel College)
  First class honors, Oriel College scholarship awarded on the basis of exam result

2 Quantitative indicators

From INSPIRE

Researcher ID H-1776-2014
Profile URL : `http://www.researcherid.com/rid/H-1776-2014`

Citation summary results	Citeable papers	Published only
Famous papers (250-500)	1	1
Very well-known papers (100-249)	5	5
Well-known papers (50-99)	13	12
Known papers (10-49)	46	32
Less known papers (1-9)	57	30
Unknown papers (0)	22	3
Metric (google scholar)	Total	Since 2014 (Unicamp)
citations	4255	1415
h-index	35	21
i10-index	69	35
Metric (Scopus)	total	(only published)
h-index	25	
Total citations	2258	

Google scholar `http://tinyurl.com/k2orbzc`

Inspire `http://inspirehep.net/author/profile/G.Torrieri.1`

Humboldt foundation `https://www.humboldt-life.de/profile/u9925809588`

FAPESP `http://www.bv.fapesp.br/en/pesquisador/674153/donato-giorgio-torrieri/`

LATTES `http://buscatextual.cnpq.br/buscatextual/visualizacv.do?id=K4835518J4`

Top Italian Scientists Listed under
`http://www.topitalianscientists.org/TIS_HTML/Top_Italian_Scientists_Physics.htm`

3 Giorgio Torrieri's Research interests overview

One of the most exciting research programs in modern-day physics has been the study, on both a theoretical and experimental level, of "quark-gluon plasma" (QGP), a state of matter where quarks and gluons, instead of being bound in hadrons, can propagate freely through space. The possibility of investigating QGP experimentally would have widespread ramifications for several areas of physics, from cosmology to the study of quantum fields out of equilibrium.

The existence of this state of matter follows intuitively from the asymptotically free nature of Quantum Chromodynamics (QCD), the theory that describes strong interactions. Numerical simulations seem to confirm the intuition. However, the details of the transition to this new state of matter are, much like the exact mechanism of quark confinement, still not understood from first principles.

The theoretical consensus led to an experimental search for QGP in high-energy heavy ion collisions, culminating with experiments at the Super Proton Synchrotron at the CERN SPS (3-18 GeV/A center of mass energy), the Relativistic Heavy Ion Collider (RHIC) at the Brookhaven national laboratory (130 and 200 GeV/nucleus) and the Large Hadron Collider at CERN (7000 GeV/nucleus). "Compressed Baryonic matter" experiments, probing a lower-temperature higher density region of the phase diagram, are also planned at the GSI facility in Darmstadt, as well as in Dubna and at RHIC future runs. The problem of conclusively distinguishing QGP production from more "mundane" hadronic reactions and relating the properties of QGP to both fundamental theories and experimental observables has proven to be a formidable one.

Both SPS and RHIC claim to have produced a "new state of matter" with many characteristics of a deconfined Quark Gluon Plasma. However, the evidence used in these announcements differs. SPS has found sharp discontinuities in energy and system size of several "soft" observables which have been considered indicators of deconfinement (multiplicities of pions, strange particles, and charmonia, as well as slopes of transverse momentum distributions). RHIC, on the other hand, reported a quenching of "hard" jets in nucleus-nucleus systems, usually regarded as an indicator for the "coloredness" of the medium's degrees of freedom, as well as the appearance of ideal fluid-like behavior. No consensus exists about the similarities and differences between the SPS and RHIC systems.

More broadly, no consensus exists about the nature of the transition to the new state, the properties defining the new state, the connection of the new state to fundamental QCD, and the threshold, in energy and system size, for the creation of the new state.

My research centers around clarifying some of these issues. I work on developing experimental probes which can determine microscopic properties of the system, and it's dynamics (evolution duration, freeze-out mechanism and dynamics, etc.), as well as phenomenological models that describe key passages of the system's evolution not understood from first principles (such as the QGP-hadron gas phase transition). Where these models are well established (as in the case of hydrodynamics), I aim to improve the currently weak connection between physical theory (QCD) and phenomenology.

I have maintained a strong contact with experimental collaborations, and aim to continue

doing so. The coming years present several exciting developments within this field: The opening of the LHC and its heavy ion program presents us with the opportunity of exploring the strongly interacting system at a regime of higher initial energy density and with a much higher statistics of hard probes. In complement, the energy scan in lower energy systems at FAIR/GSI and the SPS, gives an opportunity to look for the regime where the transition to quark degrees of freedom occurs and to investigate the nature of this transition. The next sections briefly describe, giving references to previously published works, research topics I am pursuing in chronological order.

4 Research Chronology

4.1 Masters (Birmingham University), NA57 experiment

I have partecipated in the NA57 experiment and helped analyze Λ decays in p-Be collisions, during the period delineated by the papers [102]-[128]. This work inspired me to work in theoretical research related to strangeness enhancement in heavy ion collisions. This became the topic on which I started my PhD.

4.2 PhD (University of Arizona) Statistical Mechanics applied to heavy ion collisions

During my PhD I have written and published, as an open-source software package [89], a series of tools which allow experimental groups to analyze particle multiplicity data within a statistical model framework. The ultimate aim of this work is to experimentally determine the degree of chemical equilibration and accurately constrain the freeze-out temperature and flavor phase space parameters. We have used this program to scan thermal parameters in energy and system size [84, 76] in the hope of identifying discontinuities indicative of a phase transition.

This work is to date my most cited paper, ~ 200 citations. The program I wrote, an open-source package called SHARE [89], is still widely used by experimental collaborations. Since the program is written and reasonably user friendly, I expect it to be the basis of iniciação cientifíca and maestrado projects in conjunction with experimental groups in the next few years. Part of this work was done in collaboration with a research group of the Institute of Nuclear Physics in Krakow, which started a scientific collaboration which is still on-going (while focusing on different topics! [6]).

As complementary topics, I have studied how resonance rations can be used to estimate the time between hadronization and thermal freeze-out [98, 97] and analyzed particle spectra within a single freeze-out model [100].

4.2.1 Conference and seminar presentations

- May 2004: McGill University nuclear physics seminar

- April 2004: Iowa State University nuclear physics seminar
- Krakow School of theoretical Physics, July 2004, Zakopane, Poland
  (Taught course in statistical models of heavy ion collisions)
- Focus on Multiplicity, July 2004, Bari, Italy
  (talk)
- Quark Matter 2004, Oakland, Jan. 2004
  (Poster presentation)
- APS DNP meeting, Tucson, Arizona, Nov. 2003 (mini-symposium talk)
- Strange Quark Matter 2003, Atlantic Beach, NC (Parallel session talk)
- Quark Matter 2002, Nantes, France (Poster presentation)
- PASI, Campos De Jordao, Brazil (2002)
  Presented talk on my research, contributed two articles for the school proceedings
- Quark Matter 2001, BNL, Brookhaven, NY (Poster presentation)
- Strange Quark Matter 2001, Frankfurt (Plenary session talk)
- Strange Quark Matter 2000, Berkeley, San Francisco (Poster presentation)

4.2.2 Overview of teaching philosophy

"Science is either physics or stamp collecting". Anyone taking a physics class should understand why. It's not because questions investigated by physicists are automatically more profound. It is because *scientific thinking*, the process of creatively formulating hypotheses, taking them to observable consequences through logic and mathematical methods, devising and performing experimental tests, and comparing theoretical predictions with experiment, is usually more apparent in physics than in other subjects taught at college.

Yet in my experience many students taking *advanced* physics courses, and the great majority of students taking *elementary* physics courses (especially courses required by another major), come out without having learned some of the basic aspects of physics thinking.

How does one go from a fundamental theory to testable quantitative predictions? How can one quantitatively *assess* the agreement between theory and experiment and what issues have to be understood within this assessment? In case the problem under consideration can not be solved exactly, how would one search for an approximation suitable for finding the required answers, and how can the soundness and scope of applicability of this approximation be ascertained?

One does not need to be a physics researcher for these concepts to be extremely useful. Moreover, these concepts are relevant to *any* physics topic to such an extent that understanding of the topic in question is simply impossible without having at least some mastery of them. Thus, any physics course is *incomplete* unless the following questions are asked, studied and answered with the student's active participation

- What is the theoretical picture of how the physical system in question works? How is it motivated?
- What is the experimental evidence that this picture is *correct*? How is it possible to distinguish between the correct theory and alternative scenarios? How is the theoretical picture linked to experimental predictions?
- If the theory is based on approximations, what is validity of the approximations used? When do they break down?

The application of these principles depends on the particular course and the level of student preparation. I therefore offer some examples, partly taken from my own teaching career, of how these concepts can be successfully applied to everyday physics teaching. These are not intended as a blueprint for a complete and self-contained course.

4.2.3 Teaching experience

- Teaching assistant, computational Physics
  200-level course on the application of numerical methods to physics problems
  (Iterative equation solutions, numerical integration, ODEs, curve-fitting, Monte-Carlo).
  Course taught in C programming language
- Teaching assistant, Introductory Mechanics
  Calculus-based 100-level course for Engineering majors
- Grader, Mathematical Methods in Physics
  graduate-level course covering differential geometry, complex analysis, series, group theory, special functions
- Grader, Optics and thermodynamics
  100-level course

4.3 Postdoc, McGill University

After my PhD I have become interested in the phenomenology of event-by-event fluctuations [78, 83, 57]. Unlike most systems where stastical mechanics is applicable, the heavy ion collision is far from the thermodynamic limit (the number of particles is of order 100 only), so fluctuations and higher cumulants are experimentally measurable quantities.

I have found that an analysis including *both* particle yields and fluctuations is a powerful falsifier of models based on statistical mechanics, as well as a powerful constraint on all thermal and collective parameters.

In conjunction with measurements of short-lived resonances, fluctuation studies also provide a way to gauge the amount and effect of post-formation hadronic interactions [57]. I expect this work to continue in the next few years as more fluctuation and resonance data becomes

available at all energies. At the end of the postdoc I updated the open-source program SHARE [89] to include fluctuations [78], so this study is expected to also feature in iniciação cientifíca and Maestrado projects.

4.3.1 Conference and seminar presentations

- May 2006: Torino University weekly seminar
- May 2006: CERN heavy ion forum presentation
- May 2006: Los Alamos National laboratory weekly seminar
- April 2006: Kent State University seminar
- November 2005: Warsaw University of Technology weekly seminar
- November 2005: Crakow, Niewodnisanski Institut Fiziki Jadrowy weekly seminar
- November 2005: Kielce (Poland), Akademia Swietokryzhka weekly seminar
- November 2005: Frankfurt weekly particle physics seminar
- November 2005: ECT, Trento weekly seminar
- Summer 2004: CERN heavy ion forum
- Summer 2004: Universita' degli studi di Parma particle phyisics weekly seminar
- Summer 2004: Universita' degli Studi di Milano particle physics weekly seminar
- May 2004: McGill University nuclear physics seminar
- Theory Canada 2006 (Invited speaker)
- Hot Quarks 2006 (Invited speaker)
- Strange Quark matter 2006, March 26-29 2006, UCLA, Los Angeles
  talk and co-convener of graduate student session
- Workshop of Strangeness in collisions, February 16-19 2006, Brookhaven National Laboratory (Invited speaker)
- Soft physics at ALICE experiment workshop, December 2005, Erice, Sicily (Invited speaker)
- International Symposium on Multiparticle Dynamics (ISMD) 2005, Kromeriz (Czech republic) (talk)
- Quark Matter 2005, August 2005, Budapest
  - Pedagogical talk in the pre-conference session aimed at graduate students
  - Poster
- APS April meeting, April 2005, Tampa, Florida (parallel session talk)

4.4 Alexander Von Humboldt fellow, Frankfurt University

4.4.1 Bulk-viscosity in QCD and phenomenological implications

One of the lingering problems associated with heavy ion collisions is the understanding of how the dense matter created in these collisions breaks up into particles, a process known as freeze-out. Current approaches are problematic for fundamental reasons and because they are unable to describe relevant experimental data (Particle interferometry) correctly. We have proposed

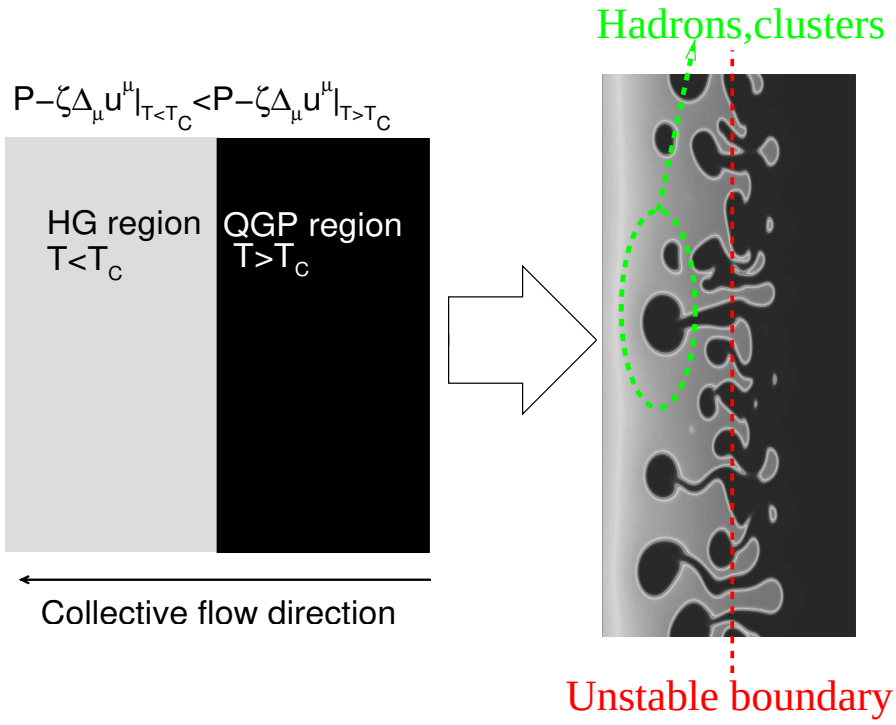

Figure 1: Hydrodynamic "viscous fingering" instabilities occurring in a expanding quark gluon plasma close to T_c. See section 4.4.1 and [70] for details

a scenario [70, 60] (Fig. 1) which might be able to solve these problems by linking freeze-out phenomenology to the behavior of bulk viscosity at the QCD phase transition. While this scenario is speculative, it has the advantage of linking fundamental aspects of QCD to experimentally observable data. In the coming years we will develop the model further with a view of finding an experimental signature [52]. Recently, these ideas have been picked up and developed by other groups and extended to non-heavy ion areas of research such as neutron star physics. I am hoping to continue research in this direction for several years to come.

We are also looking for cosmological implications of this scenario, this is the basis of the Maestrado project with Melissa Mendes (see section 5 of this memorial)

4.4.2 Analysis of AdS/CFT-inspired solutions

The use of the so-called "AdS-CFT correspondence" to study the collective properties of strongly interacting systems has recently generated a lot of theoretical interest.

While CFT is different from QCD in important ways, this approach provides us with a laboratory to study the collective properties of strongly interacting systems "analytically". We are using AdS/CFT to understand to what extent strongly interacting degrees of freedom thermalize, and how they evolve after local thermalization. For instance, in [61, 53] (carried out in conjunction with Prof. Miklos Gyulassy of Columbia University and junior collaborators) we examine the "exact" result of an infinitely heavy quark moving in a strongly interacting plasma. We hope to extend our analysis to other solutions in the near future.

A more recent research project [40] involves the attempt of constructing a "phenomenology" of AdS/CFT: Through a survey of both "hard" and "soft" heavy ion observables, we are trying to experimentally falsify the statement "current Calculations using the AdS/CFT correspondence provide a good description of the system created in heavy ion collisions". We expect to work on this project in the next few years, and the "technical work" (literature searches on a very topical subject, and experimental fits) is very appropriate to a beginning graduate student.

4.4.3 Tests of collective behavior

In the last year, I have devised experimental tests for the presence of collective behavior and for measuring the transport coefficients in the system created in heavy ion collisions [43, 69, 72, 75].

In [43] we calculated the change in the equation of state due to charm admixture into the system, and inferred a correlation between charm abundance and flow observables. This signature allows, for the first time, features of strongly coupled QCD (like Polyakov loop expectations values) to be directly accessed experimentally in a model-independent way. I look forward to further extend this field of research as LHC heavy ion events with a high charm multiplicity become available.

In [69] we relate polarization observables to hydrodynamics. In [72] we use event-by-event fluctuations of flow observables to place constrains on the Knudsen number in the heavy ion system.

Finally, we try to infer a jump in the intensive properties of the system from scaling arguments [75, 46].

While each of these works is, at this stage, somewhat qualitative, they open potential new avenues for phenomenological investigation. I expect to follow up this work as new experimental data in the relevant observables becomes available. Observables discussed in these works are being measured at all energies relevant for the ultra-relativistic heavy ion program, from the LHC to FAIR.

4.4.4 Jet energy loss in a hydrodynamic medium

The observation of jet suppression at RHIC has opened the still unresolved question of what happens with the missing jet energy.

The fluid-like behavior observed at RHIC suggests the possibility that this energy is thermalized and "encoded" in the collective flow pattern, perhaps via phenomena such as "mach cones". The observation for a signal for these phenomena would be a further confirmation of collective behavior and would allow us to constrain the equation of state and transport properties of the system created in heavy ion collisions.

With a graduate student in Frankfurt (Barbara Betz), we have used a 3D relativistic hydrodynamics code to study different patterns of jet energy deposition into the medium, and to link jet energy deposition properties to experimentally observable particle abundances and two-particle kinematic correlations [42, 39, 63]

I expect work to continue in the coming years in both of these directions, hopefully in collaboration with experimental groups.

4.4.5 Conference and seminar presentations

- January 12 2010: Seminar, Pontificia Universidad Catolica de Chile, Santiago, Chile
- November 13 2009: Seminar, University of Crete
- October 20 2009: Seminar, University of Arizona
- June 19 2009: Seminar, Heidelberg physics department
- April 21 2009: Seminar, University of Capetown, South Africa
- October 23 2008: Colloqium, INFN Institute, Catania
- August 29 2008: Colloqium, Werner Heinberg Max Plank Institute, Munich
- May 13 2008: Colloqium, Institute for Nuclear Physics, Krakow
- May 5 2008: Colloqium, Ludwig Maximilian Universitat, Munich
- January 24 2008: Colloqium, Arkansas State University
- November 29 2007:Colloqium, Illinois Institute of Technology
- November 28, 2007: University of Illinois, Chicago
- November 26, 2007: Brookhaven National Laboratory
- November 21, 2007: Yale University
- November 16, 2007: Wayne State University
- November 8th, 2007: Lawrence Berkeley National Labs

- February 2007: Institute for Nuclear Physics, Krakow, seminar
- February 2007: Charles University in Prague, seminar
- January 2007: Frankfurt University seminar (Palaver).
- CPOD 2010 - Critical Point and the Onset of Deconfinement, Dubna, Russia (invited speaker)
- INT summer institute, Seattle, Washington: Quantifying the properties of hot QCD matter (invited speaker)
- BEACH 2010 - IX International Conference on Hyperons, Charm and Beauty Hadrons, Perugia (Plenary talk)
- Quarkonium and deconfined matter in the LHC era, Martina Franca, Italy (Invited speaker)
- Sympsium "Statistical particle production:Beyond the first moment" Bad Liebenzell, Germany (invited speaker)
- Strange Quark matter 2009, October 2009, Buzios (plenary talk)
- Workshop on flow and dissipation in ultrarelativistic Heavy Ion Collisions, Trento, September 2009 (Invited speaker)
- International Symposium of Multi-particle dynamics (ISMD) 2009, Homel, Belarus (Invited speaker. Gave theory summary.)
- RHIC-AGS users meeting, Brookhaven National Laboratory 2009 (Invited speaker)
- Quark matter 2009, Knoxville, Tennessee (Parallel session Oral presentation)
- CATHIE-RIKEN Workshop, Critical Assessment of Theory and Experiment on Correlations at RHIC, Brookhaven National Lab, February 2009 (Invited speaker)
- VIII international workshop, relativistic aspects of Nuclear physics, November 2008, Rio De Janeiro, Brazil (talk)
- Strange Quark matter 2008, October 2008, Beijing (plenary talk)
- 30th International School of Nuclear physics, September 2008, Erice, Sicily (Invited speaker)
- Particle Correlations and Femtoscopy, September 2008, Krakow, Poland (Invited speaker)
- Quark confinement and the Hadron Spectrum, September 2008, Mainz, Germany (talk)
- LMU-TUM Universe Cluster Symposium, "Symmetries and Phases in the Universe", June 2008, Kloster Irsee, Germany (poster presentation)
- 2008 Krakow School for Theoretical Physics, "Aspects of Duality" (Invited speaker, taught course on physics of Mach cones)
- 19 May 2008, VI-SIM virtual institute Workshop talk
- RnM 2008, 15 May 2008, GSI Darmstadt (Plenary talk)

- Quark Matter 2008, February 2008, Jaipur, India
  Two talks (given by graduate student collaborators) and poster presentation
- Hot and dense matter in the RHIC and LHC era, February 2008, Mumbai, India (talk)
- Early Time Dynamics in Heavy Ion Collisions, August 2007, McGill University, Montreal Canada
  (talk)
- Critical Point and the Onset of Deconfinement, July 2007, DarmStadt
  (talk)
- Strange Quark Matter, July 2007, Levoca, Slovakia
  (talk)
- LHC prediction workshop, May 2007, CERN, Geneva
  (Invited speaker)
- Alexander Von Humboldt foundation conference, Munich, february 2007, (Invited speaker, topical session talk)
- Quark Matter 2006, Shanghai (poster presentation)

4.4.6 Teaching Experience

Helped supervise Doctoral students Michael Hauer and Barbara Betz, see [42, 63, 50, 58]

4.4.7 Conferences helped to organize/advise

- International Symposium of Multi-particle dynamics (ISMD) 2009, Homel, Belarus. Co-Convener of the heavy quark session
- Numerical and Conceptual Issues in Relativistic Hydrodynamics (NCRH2007), held in Frankfurt, Germany, 16-19 April 2007. Organizing committee.
- Co-convener for the Graduate Student mini-symposium of Strange Quark Matter 2006, March 26-29 2006, UCLA, Los Angeles

4.5 Visiting research scientist, Columbia University

4.5.1 Large N_c limit of Yang-Mills theories at finite chemical potential

The study of nuclear matter at moderate chemical potential has recently attracted a great deal of both theoretical and experimental interest. The latter is due to the start of a promising experimental program scanning in low energy, while the former comes from the realization that a hitherto unexplored "Quarkyonic" phase structure might be present at $\mu_B/T \sim 1, T \sim \Lambda_{QCD}$.

The lack of a model that is both unambiguously valid and computable, however, makes the theoretical exploration of this regime extremely challenging. We are trying to overcome this difficulty by using theoretically solvable toy models that incorporate the relevant features of QCD. In [41, 38], we have shown that the convergence of the N_c expansion for nuclear matter is not as trivial as one would naively expect.

These results indicate that a "phase transition" in $T - N_c$ space (temperature vs number of colors) might arise when chemical potential is of the order of Λ_{QCD}. We are in the process of further investigating these issues with the aid of phenomenological models and AdS/CFT. We are also attempting to formulate a "quarkyonic phenomenology", by developing signatures of the existence of quarkyonic matter [32], to be tested on the lattice and in experimental data. We are also looking for an equivalent transition using Gauge/string duality [37].

While this research is, by its nature, theoretical, we have recently started to study experimental implications [32], and plan to continue in this direction.

4.5.2 The rigorous definition of hydrodynamics

In discussions with the Cosmology group at Columbia University, I started working on the definition of hydrodynamics as an effective theory in a model-independent way. Currently, in a relativistic setting, this definition is lacking since, in the low viscosity limit, the interplay between microscopic fluctuations and macroscopic dynamics is poorly understood. In [35] I rewrote this problem as a perturbative field theory and showed that in this limit a "quantum" (more generally, microscopic fluctuation-driven) viscosity should arise out of purely macroscopic (hydrodynamic) degrees of freedom. This work is now the basis of the current research activity, together with Maestrado student David Montenegro.

4.5.3 Conference and seminar presentations

- December 21 2013: Weekly physics seminar, University of Barcellona, Spain
- December 18 2013: Weekly physics seminar, University of Santiago de Compostela, Spain
- December 12 2013: Weekly Physics seminar, Kavli Institute of theoretical Physics, Tokyo, Japan
- November 18, 2013: Weekly Physics seminar, BNL
- September 20 2013: Weekly Physics seminar, Unicamp
- October 31, 2012: Colloqium, Rice University
- October 30, 2012: Nuclear physics seminar, Rice University
- September 25, 2012: Theoretical physics seminar, Baruch College
- July 22, 2012: Nuclear physics seminar, Wayne State University

- July 20, 2012: Nuclear physics seminar, Michigan State University (Lansing)
- April 17, 2012: theoretical physics seminar, Duke University
- March 19, 2012: theoretical physics seminar, Uconn Storrs
- November 11, 2011: theoretical physics seminar, City College of New York
- October 31, 2011:theoretical physics seminar, MIT
- June 30, 2011: Theoretical physics seminar,Brookhaven National Laboratory
- February 22, 2011: Colloqium, UNESP Instituto de Fisica Teorica, Sao Paulo,Brazil
- January 25, 2011: Colloqium, Wayne State University, Detroit
- July 30, 2010: Theoretical physics seminar,Brookhaven National Laboratory
- April 23 2010: Seminar, Nuclear physics group, Iowa State University
- April 19 2010: Seminar, particle theory group, Uconn (Storrs)
- April 9 2010: Seminar, Theory group, Brookhaven National Laboratory
- NFQCD2013, Kyoto, Japan, December 1-10 2013
  Invited speaker
- RANP2013, Rio de Janeiro, September 2013
  Invited speaker
- Brazilian Nuclear physics Conference, Maresias, September 2013
  Invited speaker
- Lattice2013, Mainz, Germany
  Parallel session
- APS-DNP meeting, 24 october 2012
  Invited speaker, Overview talk, Mini-Symposium on Energy/Geometry Dependence of Relativistic Heavy Ion Collisions
- Resonances at the LHC Workshop, UT Austin, March 5-7 2012 (Invited speaker)
- Strange Quark Matter 2011, Krakow, Poland (Theory summary talk for the conference, and invited research talk)
- Max Born symposium, "Three days in Quarkyonic island", may 2011, Wroclow, Poland (Invited speaker)
- RIKEN symposium, "Initial State Fluctuations and Final-State Particle Correlations", Brookhaven National Laboratory, February 2-4, 2011 (Invited speaker)

Teaching experience

- Taught a course on modern physics for humanities students,
  New School of Social Research (New York), January-May 2013
- Taught several courses at summer schools.

5 Current activity (Professor Doutor, IFGW, Unicamp)

5.1 Grants

- Bolsa de pesquisa FAPESP proc. 2017/06508-7,
- partecipation in FAPESP tematico 2017/05685
- Bolsa de pesquisa FAPESP 2014/13120-7
- Bolsa de produtividade CNPQ 301996/2014-8
- Bolsa de produtividade CNPQ 301432/2017-1

5.2 My academic visits

UFRJ Research visit, invited by Eduardo Fraga, april 2016
Also gave seminars at UFF and UERJ

INT, University of Washington, Seattle participation in the extended workshop in the month of october 2016
`http://www.int.washington.edu/PROGRAMS/16-3/`

Universita' di Firenze, Italy research visit, invited by Francesco Becattini, june 2019

5.3 Visits to my research group

Leonardo Tinti Ohio State University (2017), from a Faepex Grant

Lance Labun University of Texas at Austin (2015,2018)
`http://inspirehep.net/author/profile/L.A.Labun.1`

Radoslaw Ryblewski Jagellonian University (2018) For my tematico grant
`http://inspirehep.net/author/profile/R.Ryblewski.1`

Mike Lisa Ohio State University, coming in (2020) On a fulbright fellowship
`http://inspirehep.net/author/profile/M.A.Lisa.2`

Francesco Becattini INFN Firenze, coming in (2020) from my FAPESP grant
`http://inspirehep.net/author/profile/F.Becattini.1`

5.4 Research with Students

Guillermo Gambini (Maestrado, completed 2016)
Tema de pesquisa: A stability analysis of the Gribov-Levin-Ryskin (GLR) equation.
The GLR equation is considered to be the leading non-linear correction to the BFKL evolution equation, governing the number of gluons located at very small bjorken x (i.e. carrying

a very small fraction of the nucleon momentum). Assuming azimuthal invariance, solving this equation gives a "saturation" momentum below which the gluon density becomes independent of momentum. However, the full equation is a 2+1 non-linear dissipative equation. Stability of its solutions w.r.t. *any* symmetries cannot be assumed. Guillermo studied what happens to small azimuthal perturbations to the structure functions. If they grow, this could be a source of non-hydrodynamic "elliptic flow", an important phenomenological observable in heavy ion collisions. This model would naturally solve the puzzles indicated by my earlier works [46, 75] and summarized in Fig. 2.

Guillermo's thesis was published in [15] He also attended the conference DIS2016 in Hamburg and published proceedings [16].
This work is being continued with Kayman Jhosef and Paulo de Moura. Guillermo is doing a doctorate on beyond the standard model physics at Unicamp

David Montenegro Coelho (maestrado, completed in 2016)
Tema de pesquisa: Lagrangian dissipative hydrodynamics

Hydrodynamics is thought to arise as an effective theory whose small parameter is the Knudsen number, defined to be the microscopic mean free path multiplied by the gradient of macroscopic quantities (flow, density or temperature). However, a rigorous derivation of hydrodynamics solely from these assumptions is currently lacking. We are trying to apply dissipative lagrangian techniques to this problem, in order to use effective field theory techniques to write down a consistent complete expansion of hydrodynamics. This work follows my papers [20, 35].

David Montenegro is doing a Doctorate in IFT-UNESP, but still collaborating with me. Together with visitor Leonardo Tinti we extended this description to over hydrodynamics with polarization [14, 13, 8].

This project also has two iniciação cientifíca students, Vitor Barroso Silveira (now working on a Maestrado in general relativity at IMECC) and Maria Carolina Volpato (ongoing)

Henrique Truran (Maestrado completed in 2017, ongoing Doutorado)
Tema de pesquisa: Thermalization and the Unruh effect.
The Unruh effect is the extension of Hawking radiation to accelerated systems, whereby a detector in an accelerated frame sees a thermal bath instead of the usual quantum vacuum. However, the relationship between the Unruh effect and observable physics as well as fundamental quantum field theory is somewhat contentious. It is not clear to what extent the Unruh effect is physical, rather than a rewriting of more mundane physics or even a "pathological" artifact of using unrealistic initial conditions. In this project, we use a highly simplified, exactly solvable one dimensional theory to study this problem in a way that does not rely on approximations. This work follows on [23], and will hopefully apply make a link between this physics and usual heavy ion collisions.

As a complementary project, we are examining the effect of horizons on the topological structure of QCD, based on an analogy with open quantum systems with periodic potentials. A poster on the subject, presented at the Brazilian High energy physics meeting 2019 , has won the "Best Poster" award [9]

Melissa Mendes (Maestrado, completed in 2018)
Tema de Pesquisa: A quark-gluon plasma inspired universe

We use the insights obtained from the study of quark-gluon plasma specifically "perfect" fluidity above the critical temperature and high bulk viscosity around the phase transition in a cosmological context. Specifically,we assume these properties to be "universal" for confining Yang-Mills theories, and postulate the existence of a beyond-the-standard model "Technicolor" theory whose transition temperature is around the inflation scale. We examine if different cosmological scenarios, such as inflation and dark matter, can be explained by such a theory. This work takes the concepts of [70, 60] and applies them to a cosmological context. The thesis was submitted to publication [10].

Melissa is now in McGill University doing a PhD in phase diagrams in neutron star physics.

Juliano Choi Rodriguez (Maestrado completed in June 2019, ongoing Doutorado)
Juliano worked concurrently with Henrique on the Unruh effect and thermal physics,but with a cosmological focus. Using the "WKB method" of Parikh and Wilczek, he is finding a way to compute Hawking radiation from a horizon of a de-Sitter universe filled with matter, taking time evolution into account (provided the evolution is "slow", i.e. $T_{matter}/\Gamma_{emission} \ll 1$). This permits us, for the first time, to solve a Friedmann type equation together with the backreaction from Hawking radiation. The resulting cosmological constant is dynamical, and the evolution could affect both inflation and the current acceleration of the universe.

Kayman Jhosef Goncalves (Maestrado, expected to finish september 2019)
We explored the phenomenon of limiting fragmentation, the approximate independence of the slope of the rapidity spectrum in hadronic collisions, within the most popular models (two component Glauber, and color glass) of what the initial state in high energy nuclear collisions looks like. We found that in such models there is generally violation of limiting fragmentation, when different sizes are compared and energies as high as the LHC are included. If it turns out that limiting fragmentation persists at LHC energies, we have argued that a "wounded quark model" diluted within rapidity space could successfully account for this. This research is being submitted for publication [5], Kayman expects to start a PhD and develop these topics further, possibly as a Sandwich PhD with McGill university.

An iniciação cientifíca connected with this project, with Rafael Souza, is ongoing

Paulo de Moura (Doutorado, finishes in 2021)
This PhD project follows Kayman's work and makes a link with fundamental QCD. It appears that the "wounded quark model" is phenomenologically very successful. However, no justification for it exists in fundamental QCD. Paulo's project aims to make a link between the parton model and particle production, justifying the use of "wounded partons", and to develop further signatures of this model, related to event-by-event particle number fluctuations. As an auxiliary project he is also looking for J/Ψ production in a scenario where remnants of confinement exist above the critical temperature.

5.5 Other research

- Phenomenology (in collaboration with experimental group, Profs Jun Takahashi,David Chinellato and students)

Scaling Ever since [75], I was puzzled by the very simple structure of experimental quark gluon plasma signatures when scanned across different energies and system sizes (Fig. 2), and my long-term research plan was to provide an explanation for these. Using analytical solutions [27], we have shown that simple hydrodynamics does *not* explain this scaling. A future plan is to study this issue numerically with the hydrodynamic code available to the HADREX group. This work is complementary to Guillermo Gambini's thesis.

Initial state montecarlos The scalings above can also be naturally explained by initial state processes, which have been well-studied in pp collisions by models such as PYTHIA. In conjunction with experimental groups, we have been investigating what modifications to initial state models are necessary to describe observables (mainly identified particle abundance as a function of transverse momentum) in larger (pA and AA) systems

- Non-dissipative Extensions of the ideal hydrodynamic limit
  Lagrangian and effective theory techniques can be used to extend the ideal hydrodynamic limit for systems where our usual ideal hydrodynamic intuition fails (for instance, isotropy is broken and conservation laws do not define the dynamics). We have managed to combine the ideal hydrodynamic limit with polarization [14, 13] and show that causality in this regime implies a minimum amount of dissipation that can be used to define a universal bottom-up lower viscosity limit [8]. The inclusion of Non-abelian gauge theory was also examined, and the necessity of including "ghost-like" non hydrodynamic modes developed [7]. A review is given in [6].

  This research is part of an international research program including Mike Lisa (who will come to Unicamp in 2020 on a Fulbright grant) and Francesco Becattini (who will come with my FAPESP grant). We hope this collaboration will be long and productive.

- Quantum hydrodynamics on the lattice
  My previous research on hydrodynamics with fluctuations [35] convinced me that hydrodynamics, as a field theory, was not necessarily well-defined perturbatively but could be defined non-perturbatively, and, in this case, have a non-trivial vacuum structure. It is therefore amenable to investigation using lattice field theory techniques. This paper's Figure [20] (Fig 3, attached) was selected for "Kaleidoscope", a rubric of Phys.Rev. D papers with interesting graphics. We intend to continue this investigation using the Multicore processor bought using the FAPESP bolsa de pesquisa.

  In the future, we hope to use lattice techniques to investigate doubled-variable dissipative theories such as [18] and define a fully non-perturbative fluctuation-dissipation relation for fluids.

- The equivalence principle and neutrino oscillation physics [21, 23].
  For many years I was fascinated by the Einstein's equivalence principle and its possible compatibility with Quantum mechanics, and the research environment in Campinas has allowed me to develop this fascination into a rigorous research activity. I have published a few ideas I developed over the last few years here [21], and am now developing them with Cheng-Yang Lee, a bolsista at IMECC.

  We have also found an unexpected connection between this physics and neutrino oscillations, explained in this paper [23], which was selected for Honorable mention in the

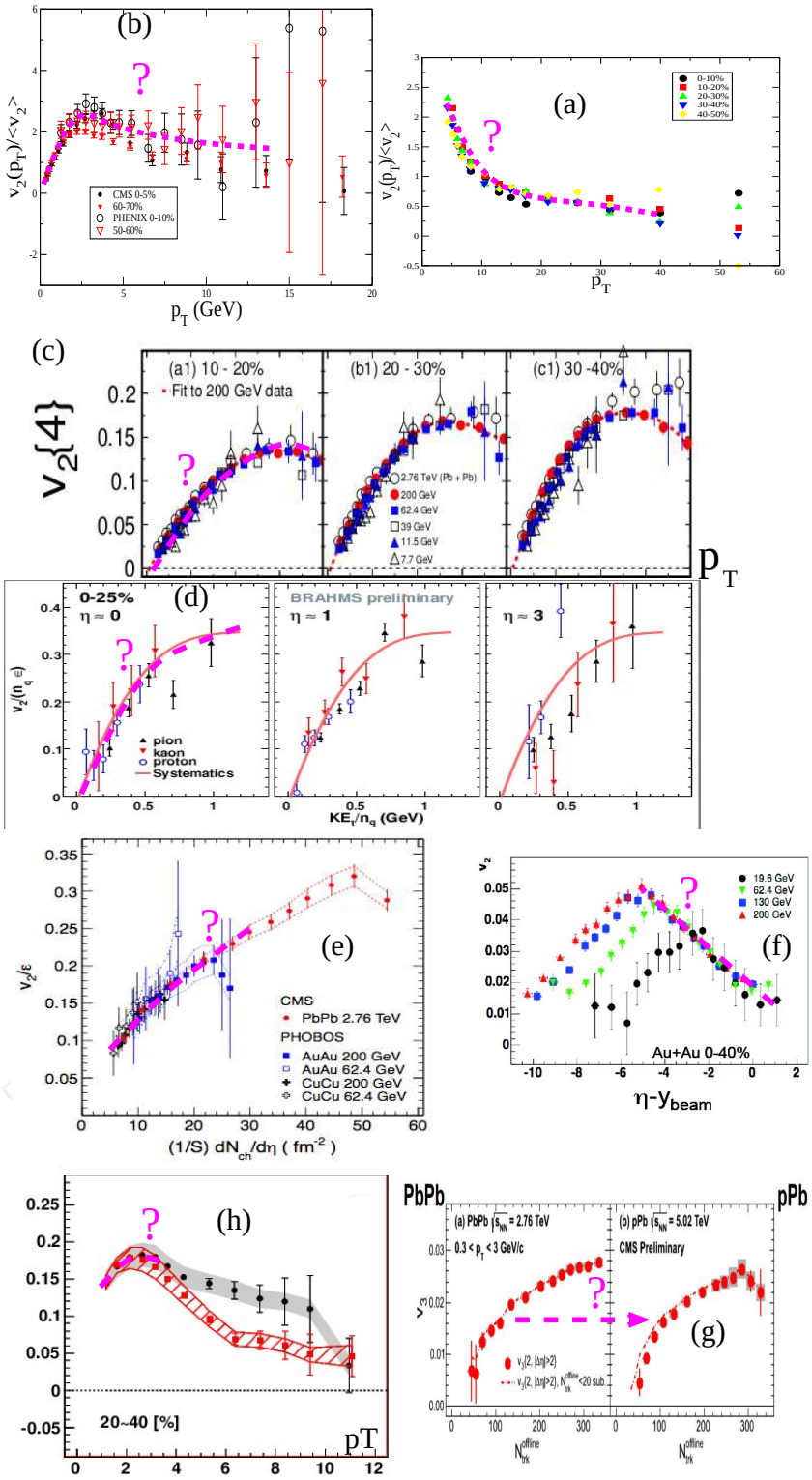

Figure 2: A compilation of experimental scalings which currently defy theoretical explanation. Guillermo Gambini's Maestrado thesis has a good elucidation of each

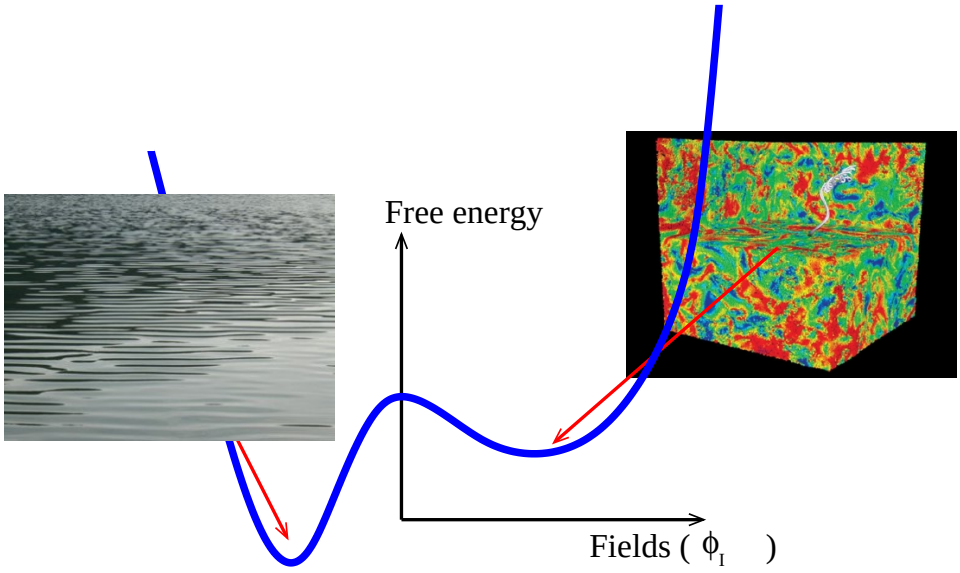

Figure 3: schematic illustration of a possible vacuum structure of the theory, in terms of a free energy including both microscopic degrees of freedom and macroscopic collective excitations.See [20] for details

gravity research foundation essay competition in 2015. This research is continuing with my collaborators in Texas and India.

5.6 Committees (Bancas), Doutorado/Maestrado

- Gustavo Salinas de Souza (Maestrado, IMECC/Unicamp, supervisor Dharam Vir Ahluwalia), 14/4/2014
- Elienos Pereira (Doutorado, IFUSP/USP supervisor Alexander Souaide), 5/9/2014
- Stefano Finazzo (Doutorado, IFUSP/USP, supervisor Jorge Noronha), 2/03/2015
- Hugo Marrocchio (Maestrado, IFUSP/USP, supervisor Jorge Noronha), 10/04/2015
- Gabriela Vitti Stenico (Seminário de Pré-Requisito, Maestrado, DRCC IFGW, supervisor Orlando Peres), 11/06/2015
- Antonio Mauricio Soares Ferreira (Maestrado, Unicamp, supervisor Arlene Aguliar), 17/02/2016
- Fernando Sartoreli Borcsik (Maestrado, Unicamp, supervisor David Chinellato) 31/03/2017
- Maicon Zaniboni (Doutorado, IFUSP/USP, supervisor Jorge Noronha) 4/07/2017
- Gibran Henrique de Souza (Doutorado, Unicamp, supervisor Ernesto Kemp, supervisor externo Cecilia Chirenti de UFABC), 26/10/2017
- Andres Navarro Alsina (Maestrado, Unicamp, supervisor Flavia Sobreira Sanchez), seminario de pre-requisito (11/9/2018) e seminario de qualificao (5/08/2019)

- Willian Mattioli Serenone (Doutorado, IFSC USP-Sao Carlos, supervisor Tereza Mendez), 25/04/2019
- Leandro Viscardi (Maestrado, IFSC USP-Sao Carlos, supervisor Tereza Mendez) 27/06/2019
- Ana Romero (Doutorado, IFGW Unicamp, supervisor Flavia Sobreira) 01/07/2019
- Pedro Caetano (Qualificacao de Maestrado, IFGW Unicamp Supervisor Flavia Sobreira), 14/08/2019
- Rafaela Rossi (Seminario de pre-requisito, IFGW Unicamp, Supervisor Orlando Peres), 23/08/2019

(Bancas of Gustavo, Stefano, Hugo were in English, others in Portuguese)

5.7 Conference presentations

- Encontro SBF de fisica nuclear e de particulas 2019
  `http://www.sbfisica.org.br/~enfpc/rtfnb/2019/index.php/pt/`
  My students Henrique Truran, Kayman Jhosef, ex-student David Montenegro and myself are giving talks about our research
- NED2019, June 2019
  `https://theory.gsi.de/~ebratkov/Conferences/NeD-2019/index.html`
  Invited speaker
- EPIPHANY in Krakow, January 2019
  `https://indico.cern.ch/event/718723/`, Invited speaker
- Quark Matter 2018, `https://qm2018.infn.it/`
  Three posters
  - With students David Montenegro and Melissa Mendes on their respective research projects
  - With experimental group, on the PYTHIA phenomenology paper we wrote together
- Workshop on Chirality, Vorticity and magnetic fields in heavy ion collisions
  march 19-22 `https://agenda.infn.it/event/13907/`
  Invited participant, talk given
- Encontro SBF de fisica nuclear 2017
  `http://www.sbfisica.org.br/~rtfnb/xl/index.php`
- Encontro da fisica 2016
  `http://sbfisica.org.br/~fisica2016/`
  My students Henrique Truran and David Montenegro as well as myself gave talks
- Zimanyi School 2015 (5/12/2015)
  `http://zimanyischool.kfki.hu/15/`
  Invited participant, talk given

- Quark Matter 2015 (23/9-3/10 2015)
  Kobe, Japao, http://qm2015.riken.jp/ (Poster)
- Brasil-JINR forum (15/6/2015)
  http://theor.jinr.ru/~bf2015/
  Invited participant, talk given
- Encontro SBF de fisica nuclear (7-11/9/2015)
  http://www.sbfisica.org.br/$\sim$rtfnb/xxxviii/
- XIII International Workshop on Hadron Physics (22-28/3/2015)
  https://indico.cern.ch/event/322559/
- Escola teoria Nuclear "Swieca" (22-28/2/2015)
  http://www.sbfisica.org.br/~evjasfnt/xvii/
  eu dei um seminário, meu Guillermo estudante Gambini deu um poster
- Meus estudantes, Vitor Barroso Silveira e David Montenegro Parteciparam, e submetiram poster, a
  XVIII Escola de Verão Jorge André Swieca de Partículas e Campos
  http://www.sbfisica.org.br/~evjaspc/xviii/
- Encontro SBF de fisica nuclear (8-12/9/2014)
  http://www.sbfisica.org.br/~rtfnb/xxxvii/
- International workshop on nonperturbative phenomena in hadron and particle physics (5-10/5/2014)
  http://200.136.79.30/QCDWorkshop2014/Welcome.html
- NPQCD workshop, IFT/Unesp (12-13/05/2014)
  http://www.ictp-saifr.org/?page$_$id=5924

5.8 Seminars

- 3 Marco 2014: Seminario GRAPHITE (IFUSP)
- 26 Abril 2014: Seminario, Istituto Fisica Matematica (IFUSP)
- Novembro 2014: Seminario, UFF (Niteroi)
- Novembro 2014: Seminario, UERJ (Rio)
- Novembro 2014: Seminario UFRJ (Rio)
- Abril 2015
  - GRAPHITE (IFUSP)
  - Universidade Cruzeiro do Sul (Sao Paulo)
  - USP-Sao Carlos Seminario de fisica Teorica
- July 2016

  - Seminar in INFN Florence, Italy
  - Seminar in the INFN Gran Sasso, Italy
  - Seminar in ICRA, Pescara, Italy

- December 2016
  - Seminar in the strong theory group, Wurtzburg University (Germany)
  - Seminar in the string theory group, Leiden University (Holland)

- April 2017: Seminar at IMPA, Rio de Janeiro
  `http://seminarios.impa.br/visualizar?id=7127`
- April 2017: Seminario GRAPHITE (IFUSP)
- March 2018: INFN, Trieste (Group of Stefano Piano)
- May 2018: ICTP, Trieste (Group of Angelo Bassi)
- January 2019: Seminar, Kielce University, Poland
- April 2019: Seminar, IFSC, Florianopolis
- May 2019: Universidad Complutense de Madrid
  `http://jacobi.fis.ucm.es/wordpress/seminario/seminario-giorgio-torrieri/`
- 8 October 2019: GRAPHITE (IFUSP)

5.9 Academic service

- Editor, European Journal of Physics A
  Edited roughly 50 papers per year on a term of 3 years as editor (Hadronic physics -theory).
  Term started in 2017, prolonged in august 2019
- Referee for Physical Review Letters ($\geq$ 30 articles), Physical Review C ($\geq$ 20 articles), Journal of Physics G,Europhysics letters, European Physical Journal A, Acta Physica Polonica
- Outstanding Referee 2014, PRL
  `https://journals.aps.org/OutstandingReferees`

5.10 Department service

- Responsible for seminars DRCC.
  Invitation and administrative handling of seminar speakers
- Membro Suplente, conselho do departamento
- Coordenador, selection of Grants PRINT/CAPES, DRCC (Grupo Cosmologia)

5.11 Teaching (in English and Portuguese)

FI144 Teoria de Campos Quanticos (2014, 2015)

FI194 Teoria de Grupos, (Segundo semestre, 2014)

F604 Mecanica Estatistica (primeiro semestre 2016)

F620 Metodos Matematicos de Fisica II (segundo semestre 2016)

FI034 Relatividade Geral (primeiro semestre 2017)

F428 Fisica III (segundo semestre 2017)

F329 Laboratorio de fisica III (primeiro semestre 2018)

F129 Laboratorio de introducao a fisica I (segundo semestre 2018 e todo 2019)

iniciação científica Vitor Barroso Silveira and Maria Carolina Volpato on hydrodynamics, Rafael Souza on the Glauber model

Curso de Verao minicourse on QCD, administered in february 2016

Le dieci pubblicazioni che considero piu importanti sono indicate in rosso e con un'asterisco

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`https://drive.google.com/file/d/1CFrrWxuVQYCTdELUPg1lCgrWPaXeuyi6/view`

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"Polarization probes of vorticity in heavy ion collisions,"
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"Bulk Viscosity driven clusterization of quark-gluon plasma and early freeze-out in relativistic heavy-ion collisions,"
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"Non-equilibrium Phase Transitions in Ultrarelativistic Nuclear Collisions,"
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"Elliptic flow fluctuations in heavy ion collisions at RHIC and the perfect fluid hypothesis,"
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"A statistical model analysis of K/π fluctuations in heavy ion collisions,"
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"Resonances and fluctuations at SPS and RHIC,"
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"Scaling of v(2) in heavy ion collisions,"
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"Hadron resonances and phase threshold in heavy ion collisions,"
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"Resonances and fluctuations of strange particle in 200-GeV Au - Au collisions,"
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"SHAREv2: Fluctuations and a comprehensive treatment of decay feed-down,"
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"Fluctuations in jet momentum as an energy loss probe,"
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"Particle multiplicities and fluctuations in 200-GeV Au - Au collisions,"
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"Constraining freeze-out with yields and fluctuations,"
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"A statistical model analysis of yields and fluctuations in 200-GeV Au - Au collisions,"
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"Particle yield fluctuations and chemical non-equilibrium at RHIC,"
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"Centrality dependence of bulk fireball properties at RHIC,"
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"Deconfinement energy threshold: Analysis of hadron yields at 11.6-A-GeV,"
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"Statistical hadronization with resonances,"
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"Hadron resonance probes of QGP,"
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"Multiplicities and bulk thermodynamic quantities at s(NN)**1/2 = 130-GeV with SHARE,"
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"SHARE: Statistical hadronization with resonances,"
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"Strange pentaquark hadrons in statistical hadronization,"
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"A comparison of statistical hadronization models,"
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"Hot hadronic matter with the NJL model,"
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"Statistical hadronization probed by resonances,"
Phys. Rev. C **68**, 034912 (2003) [arXiv:nucl-th/0212091].

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"Strange hadron resonances: Freeze-out probes in heavy-ion collisions,"
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"Strange hadron resonances and QGP freeze-out,"
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"Strangeness and QGP freeze-out dynamics,"
Presented at 36th Rencontres de Moriond on QCD and Hadronic Interactions, Les Arcs, France, 17-24 Mar 2001.
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"Strange hadrons and their resonances: A diagnostic tool of QGP freeze-outdynamics,"
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(50+ citations)

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"Strange hadron resonances as a signature of freeze-out dynamics,"
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"The strange quark gluon plasma,"
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"Search for QGP and thermal freeze-out of strange hadrons,"
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"QGP fireball explosion,"
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"Strange and multi-strange baryon production at SPS as a probe of QGP AIP Conf. Proc. **549**, 363 (2002).

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"Multi-strange particle enhancements in Pb Pb interactions at 158-GeV/c per *Prepared for 30th International Conference on High-Energy Physics (ICHEP 2000), Osaka, Japan, 27 Jul - 2 Aug 2000*

[104] F. Antinori *et al.*,
"Strangeness production in Pb Pb collisions at the CERN SPS: Results from *Prepared for 30th International Symposium on Multiparticle Dynamics (ISMD 2000), Tihany, Lake Balaton, Hungary, 9-15 Oct 2000*

[105] F. Antinori *et al.*,
"Multistrange baryon production in heavy ion reactions at the SPS,"
Nucl. Phys. A **685**, 407 (2001).

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"Determination of the event centrality in the WA97 and NA57 experiments,"
J. Phys. G **27**, 391 (2001).

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"Strange baryon production in Pb Pb collisions at 158-A-GeV/c,"
J. Phys. G **27**, 375 (2001).

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"Study of the production of strange and multi-strange particles in lead lead interactions at the CERN SPS: The NA57 experiment,"
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"Strange particle production in p Be, p Pb, Pb Pb at 158-A-GeV/c (WA97 experiment),"
Nucl. Phys. A **681**, 141 (2001).

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"Strangeness production in p Be, p Pb and Pb Pb interactions,"
Prepared for International Europhysics Conference on High-Energy Physics (EPS-HEP 99), Tampere, Finland, 15-21 Jul 1999

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"Probing the specific entropy produced in ultrarelativistic heavy ion collisions with a silicon pixel multiplicity detector: A simulation study,"
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"Enhancement of strange and multi-strange baryons in central Pb Pb Nucl. Phys. A **663**, 717 (2000).

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"Silicon pixel detectors for tracking in NA57,"
Nucl. Phys. A **661**, 716 (1999).

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"Transverse mass spectra of strange and multiply-strange particles in Pb - Pb collisions at 158-A-GeV/c,"
Nucl. Phys. A **661**, 481 (1999).

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"Hyperon and negative particle production at central rapidity in proton beryllium interactions at 158-GeV/c,"
Nucl. Phys. A **661**, 476 (1999).

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"Production of strange and multistrange hadrons in nucleus nucleus collisions at the SPS,"
Nucl. Phys. A **661**, 130 (1999).

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"Transverse mass spectra of strange and multi-strange particles in Pb Pb collisions at 158-A-GeV/c,"
Eur. Phys. J. C **14**, 633 (2000).

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"Determination of the number of wounded nucleons in Pb + Pb collisions at 158-A-GeV/c,"
Nucl. Phys. A **661**, 357 (1999) [Eur. Phys. J. C **18**, 57 (2000)].

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"Strangeness enhancement at midrapidity in Pb Pb collisions at 158-A-GeV/c: A comparison with VENUS and RQMD models,"
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"Strangeness enhancement at mid-rapidity in Pb Pb collisions at 158-A-GeV/c,"
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"Lambda, Xi and Omega enhancement at central rapidity in Pb Pb collisions at 158-A-GeV/c,"
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"Experiment NA57 at the CERN SPS,"
J. Phys. G **25**, 473 (1999).

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"Di-V0 events in Pb Pb collisions at 158-A-GeV/c,"
J. Phys. G **25**, 423 (1999).

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"Strange baryon production in p Pb collisions at 158-GeV/c: A comparison with VENUS model,"
J. Phys. G **25**, 345 (1999).

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"Lambda, Xi and Omega production at mid-rapidity in Pb Pb and p Pb collisions at 158-A-GeV/c,"
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"Strangeness enhancement at mid-rapidity in Pb Pb collisions at 158-A-GeV/c,"
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"The NA57 trigger processor,"
Given at 4th Workshop on Electronics for LHC Experiments (LEB 98), Rome, Italy, 21-25 Sep 1998

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"Enhancement of central Lambda, Xi and Omega yields in Pb Pb collisions at 158-A-GeV/c,"
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International Relativistic Astrophysics Ph. D.

Surname Name

Martínez Avilés, Gerardo

Photo

Position: Astronomer at Universidad Iberoamericana Mexico (PhD student at IRAP, based in Nice)

Period covered: 2014 - 2017

I Scientific Work

Diffuse radio sources in galaxy clusters

II Conferences and educational activities

Schools

September 2019 Vatican Observatory Summer School, Castel Gandolfo, Italy
June 2016 Vatican Observatory Summer School, Castel Gandolfo, 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
November 2014 3rd LOFAR Data processing school, Dwingeloo, Netherlands
August 2014 SAC summer school Stars, planets and life in the universe, Aarhus Denmark
June 2011 First Mexican School of Astrobiology, Mexico City, Mexico
July 2008 HAMSYS Symposium, Guanajuato, Mexico

Conferences

April 2017 Physics of the intracluster medium, Beijing, China (Talk)
September 2009 XXIII National Congress of Astronomy, Ensenada, Mexico (Poster)

Research visits

February 2017 Université Paris Diderot, Paris, France (Collaboration with Gabriel Pratt and Monique Arnaud)

January 2017 Leiden University, Leiden, Netherlands (Collaboration with Huib Intema)

February-May 2016 Istituto di Radioastronomia, Bologna, Italy (Collaboration with Tiziana Venturi)

June-August 2015Victoria University, Wellington, New Zealand (Work with Melanie Johnston-Hollitt)

2019 List of Publications

- G. Martinez Aviles, M. Johnston-Hollit et al. ATCA observations of the MACS-Planck Radio Halo Cluster Project – II. Radio observations of an intermediate redshift cluster sample. 2018, A&A, 611, A94

- G. Martinez Aviles, C. Ferrari, M. Johnston-Hollit et al. ATCA observations of the MACS-Planck Radio Halo Cluster Project - I. New detection of a radio halo in PLCK G285.0-23.7. 2016, A&A, 595, A116.

- B.Vukotic, D.Steinhauser, G.Martinez-Aviles et al. "Grandeur in this view of life": N-body simulation models of the Galactic habitable zone. 2016, MNRAS, 459, 351

- R. Adam, O. Hahn, F. Ruppin, ... , G. Martinez Aviles et al. Sub-structure and merger detection in resolved NIKASunyaev-Zel'dovich images of distant clusters. 2018, A&A, 614, A118

Becerra Vergara, Eduar Antonio

Position: Ph.D. Student
Period covered: 2018- present

I Scientific Work

In the development of the Ph.D., my main research field focuses on the creation, emission, and annihilation of neutrinos-antineutrinos pairs around compact objects under the model of induced gravitational collapse (IGC) and their connection with the generation of long-duration gamma-ray bursts (LGRBs). I have been studying the neutrino-antineutrino annihilation rate as well as the energy deposition and their influence on the luminosity of LGRBs. Another field in which my work focuses is in dark matter, more precisely, I have studied the physics of self-gravitating objects formed by fermionic dark matter, as well as the orbits of massive particles, in the field of general relativity, in the space-time generated by such objects.I haverecentlydabbled in the topic of dark matterstudying the physics of self-gravitationalobjects, aswellas theorbits of massive particles, in the field of general relativity, in space-time generated by suchobjects.

I havealsodabbled in the study of otherexoticastrophysicalobjectssuchasneutronstars and quark stars.Mainly I havestudied the effects of anisotropy on mass-radiusdiagrams and the resulting maximum mass using an interacting quark equation of state. Thisanisotropyisgeneratedas the differencebetween the radial and the tangential pressure in the hydrostaticequilibriumequationwhichisobtained by solvingthe Einsteinfieldequations in the interior of a star.Additionally, I haveworkedintootherfields of astrophysicalinterestas the stability of staticaxisymmetricrelativisticthin disks in general relativity, by introducing a first-orderperturbationinto the energy-momentumtensor of the fluid in order the characterizeastrophysicallyrelevantgalactic or accretion disks models.

II Conferences and educational activities

II a - Conferences and Other External Scientific Work

- The Fourth Zeldovich virtual meeting – September 7 to 11, 2020. *Assistant*
- 6th Italian-Korean Symposium on Relativistic Astrophysics – July 1 to 5,2019. *Assistant*
- Open Universe International Doctoral School "The discovery of BlackHoles" How the discovery of a Black Hole in GRB 190114C and in M87 ismodifying the human outlook from planet Eart. – June 10 to 14th, 2019 inICRANet Seat at Villa Ratti – Nice (France). Talk:*The geodesics motion of S2 and G2 as a test of the fermion dark matter constituency of our galactic core.*
- XXIV Iberoamerican Congress of Catalysis, Medellin - Colombia, September 15 to 19th, 2014. Talk: *Influence of the support and the ratio Co/(Co+Mo) in the selectivity HDS/HIDO of catalysts for FCC naphtha HDT.*

- XXIII Iberoamerican Congress of Catalysis, Santa Fe - Argentina, September 2 to 7th, 2012. Talk: *Study of effect the inhibition by aromatic compounds on the hydrodesulfurization reaction of dibenzothiophene*.

- XXVI Colombian Congress of Chemical Engineering, Barrancabermeja - Colombia, September 1 to 4th, 2011. Talk: *Inuence of aromatics and temperature on the desulfurization of a heavy cut for diesel production.*

II b -Seminaries

- Probing the effect of background fields on the polarization of photons fromCMB to lasers, November 15th, Pescara, Italia.*Assistant*

- Quantum-systems investigations vs optical-systems ones, November 7th, Pescara, Italia.*Assistant*

- Magnetars, Magnetized Black Holes and Laboratory Astrophysics, September 12th, Pescara, Italia.*Assistant*

- Higgs inflation with a running kinetic term, June 25th, Pescara, Italia. *Assistant*

- Technical Project Management with Standard PMI, October – November, 2011.*Assistant*

III. Service activities

III a. Within ICRANet

III b. Outside ICRANet

- Lecturer. March 2015 to July 2018. Lecture: *Waves and particles*. Physics Department, Universidad Industrial de Santander – UIS.

- Lecturer. February to July 2016. Lectures: *Differential Calculus*. Basic Science Department, Universidad Santo Tomas.

- Lecturer. February to July 2016. Lectures: *Mathematics with applications in economics*. Basic Science Department, Universidad Santo Tomas.

- Lecturer. November 2013 - September 2014. Lecture: *Transport phenomena*. Physics Department, Universidad Industrial de Santander – UIS.

List of Publication

- J.D.Uribe, E. A. Becerra-Vergara and J. A. Rueda, *Neutrino Oscillations in Neutrino-Dominated Accretion Around Rotating Black Holes*, Universe 1, 0 (2021).

- E. A. Becerra-Vergara, J. A. Rueda, and R. Ruffini, *A test of the fermion dark matter of the supermassive compact object at the center of our galaxy,* Proceeding of the9th International Workshop on Astronomy and Relativistic Astrophysics: From quarks to cosmos, Astro. Nachr (2020).

- E. A. Becerra-Vergara, C.R. Argüelles, A. Krut, J. A. Rueda, and R. Ruffini, *The geodesic motion of S2 and G2 as a test of the fermion dark matter constituency of our galactic core*, A&A, 641, A34 (2020).

- E. A. Becerra-Vergara, Sindy Mojica, F. D. Lora-Clavijo, and Alejandro Cruz-Osorio, *Anisotropic quark stars with an interacting quark equation of state*, Phys. Rev. D 100, 103006(2019).

- E. A. Becerra-Vergara, F. L. Dubeibe, and G. A. González, *On the influence of the mass definition in the stability of axisymmetric relativistic thin disks,*Rev. Acad. Colomb. Cienc. Ex. Fis. Nat. D 41(158), 22-29(2017).

Patents

- E. A. Becerra-Vergara, M. P. Ramirez, D. J. Pérez-Martínez, S. A. Giraldo,*Catalizador soportado en aluminosilicato amorfo (asa) para la remoción selectiva de azufre de naftas y metódo de fabricación del mismo***,**Colombia NC2017/0007866 (2020).

Vieira Lobato Ronaldo

Position: IRAP Ph.D. Student
Period covered: 2016-2019

Position: Collaborator
Period covered: 2019-2020

I Scientific Work

Relativistic astrophysics:

Electromagnetic emission mechanisms of white dwarfs and neutron stars, with Profs: Manuel Malheiro, Jorge A. Rueda, Jaziel Coelho and Remo Ruffini.

Structure and evolution of white dwarfs, in collaboration with Profs: Jorge A. Rueda, Edson Otoniel and Manuel Malheiro.

Gravitation:

Higher-dimensional and alternatives theories of gravity, in collaboration with Drs: Pedro Moraes, José Domingo and Geanderson Carvalho

Nuclear physics:

Nuclear structure, many-body physics and few-body physics, in collaboration with Prof. Carlos A. Bertulani

II Conferences and educational activities

VII Amazonian Workshop on Gravity and Analogue Models.

Amazonian High Studies School in Theoretical Physics (Part II)

Black holes and exotic compact objects

Numerical relativity modelling of sources of gravitational waves

Exploring black hole physics with numerical relativity

II Latin American Strategy Forum for Research Infrastructure: an Open Symposium for HECAP

Quantum spacetime and the Renormalization Group

Mathematical and Computational Approaches for Solving the Source-Free Einstein Field Equations

INT Virtual Workshop: Renormalization Group Approaches to the Many-Body Problem

3rd South American Dark Matter Workshop

Workshop on New Trends in Dark Matter

2019-2020 List of Publication

R. Lobato et al. Neutron stars in f(R,T) gravity using realistic equations of state in the light of massive pulsars and GW170817. JCAP 12(2020) 039

C. A. Bertulani and R. V. Lobato. Neutron tunneling: A new mechanism to power explosive phenomena in neutron stars, magnetars, and neutron star mergers. arXiv:2011.14953 [astro-ph, physics:nucl-th], November 2020.

C. A. Bertulani and R. Lobato. Final state interaction in the pn and nn decay channels of $^4_λ$He. arXiv:2010.14083 [nucl-th], October 2020.

G. A. Carvalho, F. Rocha, H. O. Oliveira, and R. V. Lobato. General approach to the Lagrangian ambiguity in f(R,T) gravity. arXiv:2008.13326 [gr-qc], August 2020.

JDV Arbañil, GA Carvalho, RV Lobato, RM Marinho Jr, M Malheiro. Extra dimensions' influence on the equilibrium and radial stability of strange quark stars. Physical Review D 100 (2), 024035 (4), 2019

Lobato, R. V., Carvalho, G. A., Martins, A. G., Moraes, P. H. R. S. Energy nonconservation as a link between $f(R,T)$ gravity and noncommutative quantum theory. The European Physical Journal Plus, 2019.

Yunis, Rafael Ignacio

Position: PhD Student
Period covered: December 2019 - December 2020

I Scientific Work

PhD on Relativistic Astrophysics (In course)

Currently enrolled at the IRAP joint PhD program between Sapienza University in Rome and ICRAnet, since April 2018. Currently working under Dr. Carlos Argüelles (UNLP) on selected topics on Dark Matter self-interactions and its effect on decoupling at the early universe and at structure formation. In collaboration with the UNLP cosmology group. Current interests are on Dark Matter, Cosmology, Structure Formation and DM indirect detection.

II Conferences and educational activities

II a Conferences and Other External Scientific Work

Speaker at Fourth Zeldovich virtual meeting
Virtual Meeting, July 2020
Attended and presented ``Self Interactions in WDM: A View From Cosmological Perturbation Theory (CPT)" at the Fourth Zeldovich Virtual Meeting. Proceedings will be published in the refereed journal Astronomy Reports.

Invited Speaker at VIII Cosmo@AR Meeting
Virtual Meeting, October 2020
Attended and presented ``Self Interactions in WDM: A View From Cosmological Perturbation Theory (CPT)" at the VIII Cosmo@AR meeting, organized by the Argentinian cosmology community.

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

2020 List of Publications

Rafael I. Yunis, Carlos R. Argüelles, Diana López Nacir. *Boltzmann hierarchies for self-interacting warm dark matter scenarios.* In Journal of Cosmology and Astroparticle Physics 9, 2020. arxiv:2002.05778.

Rafael I. Yunis, C. R. Argüelles, N. E. Mavromatos, A. Moliné, A. Krut, M. Carinci, J. A. Rueda, R. Ruffini. *Galactic Center constraints on self-interacting sterile neutrinos from fermionic dark matter (``ino'') models*. In Physics of the Dark Universe 30, 2020. arxiv:2008.08464.

Carlos R. Argüelles, Manuel Díaz, Andreas Krut, Rafael I. Yunis. *On the formation and stability of fermionic dark matter halos in a cosmological framework.* In Monthly Notices of the Royal Astronomical Society, 2020. arxiv:2012.11709

Rafael I. Yunis, C. R. Argüelles, Diana López Nacir, Claudia Scóccola, Gastón Girodano. *Self Interactions in Warm Dark Matter: A View from Cosmological Perturbation Theory.* Proceedings of the Fourth Zeldovich Meeting. To be published in Astronomy Reports.

IRAP Ph. D. Erasmus Mundus Students

Aimuratov Yerlan

Position current: researcher at Fesenkov Astrophysical Institute
Position former: EMJD IRAP V cycle PhD student at Sapienza U
Period covered: January 2015–January 2021

I Scientific Work

GRB, GRB-SN, Wolf-Rayet stars: observation and analysis

Thesis discussion at Sapienza University of Rome "Gamma-Ray Bursts within fireshell model", 25.02.2020 (supervisor: prof. R. Ruffini)

II Conferences and educational activities

II a Conferences and Other External Scientific Work

- Weekly ICRANet seminars by invited Professors, PostDocs and Students, March 2015-Dec. 2019
- "NS Merger Training Workshop", PhD school, 2018 November 11th-16th, Bertinoro, Italy
- Seminar at Fesenkov Astrophysical Institute, 2018 July 19th, Almaty, Kazakhstan
- "Fifteenth Marcel Grossmann Meeting", 2018 July 1st-7th, Rome, Italy
- "DIAS-2018 Summer School in HEA", 2018 June 19th-29th, Dublin, Ireland
- "SNAUPS-2018 (Third Zeldovich Meeting)", 2018 April 22nd-25th, Minsk, Belarus
- "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
- Seminar at Fesenkov Astrophysical Institute, 2015 August 5th, Almaty, Kazakhstan
- "14th Italian-Korean Symposium on Relativistic Astrophysics", July 20th-24th, Pescara, Italy
- "Fourteenth Marcel Grossmann Meeting", 2015 July 12th-18th, Rome, Italy
- "1st ICRANet Lecture Series for PhD students" organized by L. Izzo, February-June 2015

II b Work With Students

- GBM data analysis, Jun 2017-Dec 2019 with R. Moradi, D. Primorac, Y. Wang,
- LAT-LLE data reduction and analysis, Oct 2016 with M. Kovacevic
- XRT data analysis, Mar-Sep 2016 with 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

- data reduction and analysis with ICRANet PostDoc Y. Wang, Sep-Dec 2018

- fireshell model and GRBs analysis with RMFIT, XSPEC with M. Muccino, Feb 2015-Nov 2017
- data reduction and analysis with HEASOFT with L. Izzo, Nov-Dec 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 "Short Gamma-Ray Bursts", parallel session BN5
  "Fifteenth Marcel Grossmann Meeting", 2018 July 1st-7th, Rome, Italy
- participation and oral presentation "Gigaelectronvolt emission in Gamma-Ray Bursts"
  "SNAUPS-2018 (Third Zeldovich Meeting)", 2018 April 22nd-25th, Minsk, Belarus
  http://www.icranet.org/images/stories/Meetings/ZM3/program.pdf
- 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 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"
  "Fourteenth Marcel Grossmann Meeting", 2015 July 17th, Rome, Italy
  parallel session GB5-A: http://www.icra.it/mg/mg14/parallel_sessions.htm

III b. Outside ICRANet

- group seminars at Fesenkov Astrophysical Institute, since January 2021
- group seminars at the al-Farabi Kazakh National University, since December 2020
- supervising Bachelor, Master and PhD students, since September 2020
- courses for Master students at the al-Farabi Kazakh National University, since November 2019
- participation in "NS Merger Training Workshop" for PhD students and young researchers
  Centro Residenziale Universitario di Bertinoro, 2018 November 11th-16th, Bertinoro, Italy
- oral presentation: "Gigaelectronvolt emission in Gamma-Ray Bursts"

seminar at Fesenkov Astrophysical Institute, 2018 July 19th, Almaty, Kazakhstan

- participation in "DIAS-2018 Summer School in HEA" for PhD students and young researchers
  Dublin Institute of Advanced Studies & Dublin City University, 2018 June 19th-29th, Dublin, Ireland
- 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

2015-2020 List of Publication

- https://orcid.org/0000-0001-5717-6523

Surname Name

Gregoris Daniele

Position: Postdoc at Yangzhou University (up to August 2020), Assistant professor at Jiangsu University of Science and Technology (since September 2021).
Period covered: 1st January 2020 – 15th January 2021

I Scientific Work

- I have investigated a possible technique formulated in differential geometry for locating the horizon of black holes as the zeroes of some appropriate scalar polynomial curvature invariants and Cartan invariants. This allows to tame the teleological nature of black hole horizons. In particular, I focused my attention in clarifying the different roles of the Ricci and Weyl curvature inside this algorithm.

- I have investigated the physical viability of some inhomogeneous and anisotropic cosmological models by imposing some thermodynamical requirements (second law and holographic principle), and by discussing the propagation of light rays and how the inhomogeneities affect the Hubble diagram.

- I have investigated how black holes interact with their surrounding environment exchanging energy with the cosmic dark matter and dark energy fluids. I have adopted the McVittie formalism and I have constructed a new black hole solution which generalizes the Schwarzschild-deSitter by replacing the cosmological constant with a form of evolving dark energy.

II Conferences and educational activities

II a Conferences and Other External Scientific Work

I delivered the talk "Curvature Invariants, and Black Hole Horizons", at the Fourth(Virtual) Zel'dovich meeting organized by ICRANet and National Academy of Scienceof Belarus in September 2020, and at the (Virtual)AAPPS-DACGWorkshop on Astrophysics, Cosmology and Gravitation in November 2020.

II c Diploma thesis supervision

Since October 2020 I have been mentoring the master student Karmend Abdulla at Jiangsu University of Science and Technology about the cosmological Friedman model.

II d Other Teaching Duties

In the 2020 Autumn semester I taught the course "College Physics II" at Jiangsu University of Science and Technology (about 40 hrs and 40 students).

II e. Work With Postdocs

I have co-authored the preprint: Mahdis Ghodrati, Daniele Gregoris, "On the Curvature Invariants of theMassive Banados-Teitelboim-Zanelli Black Holes and Their HolographicPictures",arXiv:2003.04412 [hep-th] (currently submitted to a journal) with another postdoc at YangzhouUniversity.

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 have co-authored the manuscript: Daniele Gregoris, Kjell Rosquist, "Observational backreaction in discrete black holes lattice cosmological models", EPJ Plus 136 (2021) 45 arXiv:2006.00855 [gr-qc] together with my former PhD supervisor and former ICRANet affiliated (now retired).

- I have been discussing the thermodynamics of black holes together with prof. SheSheng Xue, ICRANet faculty member.

IV. Other

- I have been serving as a reviewer for Mathematical Reviews at the American Mathematical Society, and as a referee for a number of scientific journals including Classical and Quantum Gravity and European Physical Journal C. It is possible to check my records by searching my names in the Publons and MathSciNet databases. I have achieved the Trusted Reviewer Status by the Institute of Physics IOP.

- I have won the 2020 Galaxies Travel Award of the journal Galaxies of MDPI.

- I held a 80k CNY grant from the China Postdoctoral Science Foundation(Grant no. 2019M661944). This grant should not be confused with my personal salary paid from the university, but it constitutes a budget for covering research-related expenses (attendance of conference, purchase of equipment, hosting and visiting collaborators,…).

2020-2021List of Publication

- Daniele Gregoris, Yen Chin Ong, and Bin Wang, "Holographic Principle and the Second Law in Stephani Cosmology Revisited", EPJPlus 135 (2020) 246 arXiv:1906.02879 [gr-qc].
- Muhsin Aljaf, Daniele Gregoris, Martiros Khurshudyan, "Phase space analysis and singularity classification for linearly interacting dark energy models", EPJC 80:112 (2020) arXiv:1911.00747 [gr-qc].
- Daniele Gregoris, Yen Chin Ong, and Bin Wang, "The Horizon of the McVittie Black Hole: On the Role of the Cosmic Fluid Modeling", EPJC 80:159 (2020), arXiv:1911.01809 [gr-qc].
- Salvatore Capozziello, Rocco D'Agostino, Daniele Gregoris, "Black holes and naked singularities from Anton-Schmidt's fluids", Phys. Dark Univ. 28 (2020) 100513, arXiv:2002.04875 [gr-qc].
- Daniele Gregoris, Yen Chin Ong, Bin Wang, "Thermodynamics of Shearing Massless Scalar Field Spacetimes is Inconsistent With the Weyl Curvature Hypothesis", Phys. Rev. D 102, 023539 (2020), arXiv:2004.10222 [gr-qc].
- Daniele Gregoris, Kjell Rosquist, "Observational backreaction in discrete black holes lattice cosmological models", EPJ Plus 136 (2021) 45 arXiv:2006.00855 [gr-qc].

Bruno Arsioli **Photo**

Position: Research Associate (post-doc)
Period covered: 2017-2021

I Scientific Work

Researcher with a focus on Multi-frequency & Multi-messenger Astrophysics.Investigate the application Machine Learning for source classification, feature extraction, and source discovery based on multi-frequency data (Python). Vast experience in cross-matching archival data from radio up to gamma-rays and astroparticles, to build multi-messenger spectral data-frames. Acquainted with gamma-ray data analysis with Fermi-LAT. Develop shell Scripts for parallel computing on clusters. Deal with large-scale gamma-ray data analysis for all-sky surveys, and cross-match big datasets for astrophysical source discovery.Expertise involving all stages of large catalogue preparation, validation, and release, including statistical tests for the study of population properties. Closely involved with the search & detection of new gamma-ray blazars and VHE candidates (1 & 2BIGB, 1 & 2WHSP, and 3HSP catalogues).

II Conferences and educational activities

II a Conferences and Other External Scientific Work

Schools & training

Neutrino Physics and Astrophysics School; Campinas (Brazil), 03-26 Sep. 2019.

Machine Learning Techniques & Data Science; MIT, Stanford and IBM courses on Edx, Coursera and Udacity portals, 2019 - 2020.

Machine Learning with Python; IBM course on Edx, Jan 2019.

Analyzing &Visualizing data with Python; IBM courses on Edx, Jan 2019.

IRAP Relativistic Astrophysics Winter School; Nice (France), Feb. 23 - Mar. 2, 2014.

Summer Schools in Relativistic Astrophysics, Nice (France), 15-31 May & 2121 Sep, 2013.

SIGRAV Graduate School in Contemporary Relativity and Gravitational Physics, Villa Olmo, Como (Italy), 21–26 May, 2012.

Erasmus Mundus School in Relativistic Astrophysics, Nice (France), 5–8 June & 3-19 Sep, 2012

IISS Summer School on Magnetohydrodynamics MHD and Energetic Particles, Aix en Provence (France), June 20-24, 2011.

Nuclear Fusion Science and Engineering Physics Summer School, Nancy (France), 2009.

Conferences

Extreme19 – Conference on Extreme Blazars, Padova (Italy), Jan 22-25, 2019. Presentation: The 2BIGB gamma-ray catalogue: Extreme & High Synchrotron Peak Blazars newly detected over 10 years of Fermi-LAT observations.

SuperdenseMatter in theUniverse, Workshop, Instituto Nacional de Pesquisas Espaciais (Inpe), São José dos Campos (Brazil), June 28 2017. Invited: Improving our description of γ-ray sky. Direct search for GeV sources with Fermi-LAT.

Cosmic Ray & Chronology Department (DRCC) Seminar, GlebWataghin Institute – IFGW Unicamp, Campinas (Brazil), Aug. 18 2017. Invited: Active Galactic Nuclei and Blazars. An Open Window to the Very High Energy Universe.

Adriatic Workshop on Supernovae and Hypernovae, ICRANet, Pescara (Italy), June 28, 2016. Presentation: The isotropic γ-ray background: Contribution from HSP blazars.

MG14, 14th Marcel Grossmann Meeting, Rome (Italy), July 12-18, 2015 Presentation: Multi-frequency Data for Unveiling gamma-ray sources.

Cross-Match Day. ASDC-ASI Rome (Italy) 2015. Talk: WHSP blazar catalogue. Drops in the Ocean.

ICRANet Brazilian Science Data Center Symposium. UFRGS, Porto Alegre (Brazil), Sep. 03 2015. Presentation: Science Catalogues, an Example from the ASI Science Data Center.

2nd César Latter meeting, Niterói – Rio De Janeiro (Brazil), April 13–18, 2015. Presentation: Very High Energy candidates for observation with Cherenkov Telescope Array (CTA)

Black Holes: the largest energy sources in the Universe: 1st Scientific ICRANet Meeting in Armenia, Yerevan (Armenia), 30 June – 4 July 2014. Plenary talk: VHE-TeV Blazar Candidates for the Upcoming Cherenkov Telescope Array (CTA).

Zeldovich–100 Meeting in Subatomic particles, Nucleons, Atoms, Universe. International conference in honour of Ya. B. Zeldovich 100th Anniversary, Minsk (Belarus), March 10-14, 2014. Plenary talk: Active Galactic Nuclei & Very High Energy Blazars.

Bologna High Energy Meeting - Boehme, Bologne (Italy), April 7-9, 2014.

IRAP Ph.D. Erasmus Mundus Workshop; Supernovae, Gamma-ray bursts and the induced gravitational collapse, Les Houches (France), May 11–16, 2014.

Magic AGN WG Meeting, ASI-ESRIN Science Data Center, Frascati (Italy), 11-14 Feb, 2013.

Erasmus Mundus School, Nice, France, 15th – 31st May, 2013. Presentation: Selection schemes for building samples of HSP blazars: TeV candidates.

The 2013 yearly ICRANet Scientific Meeting on Relativistic Astrophysics, Pescara (Italy), June 3–21, 2013. On the Occasion of the 50th Anniversary of the Kerr solution of the Einstein's equations.

Erasmus Mundus Summer School in Relativistic Astrophysics, Nice (France), 2-21 Sep, 2013. Presentation: Statistical Properties of HSP blazars: TeV Candidates.

10th Agile Workshops ASDC, Rome (Italy). April 18 2012.

Erasmus Mundus School on Relativistic Astrophysics, Nice (France), 3-19 Sep. 2012. Presentation: Active Galactic Nuclei and Blazars.

MG13, 13th Marcel Grossmann Meeting, Stockholm (Sweden), 1–7 July, 2012.

II b Work With Students

II c Diploma thesis supervision

Advisor. Master degree in Physics. Student: Blessing Musiimenta. Thesis: Identification of new gamma-ray blazars with Fermi-LAT. Mbarara University of Science and Technology, Uganda (Oct. 2019). Currently accepted for a PhD in Astrophysics at Bologna University - Italy.

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

Thesis Referee (Evaluation Committee Member). Ph.D. degree in Relativistic Astrophysics, IRAP.Student: Juan David Uribe Suárez. Thesis: Neutrino oscillation within the induced gravitational collapse paradigm of long γ-ray bursts. Sapienza University of Rome, Italy (2019).

Thesis Referee (Evaluation Committee Member). Ph.D. degree in Relativistic Astrophysics, IRAP. Student: YuLing Chang. Thesis title: Multifrequency studies of very-high-energy peaked blazars. Sapienza University of Rome, Italy (2014-2018).

Thesis Referee (Evaluation Committee Member). Ph.D. degree in Relativistic Astrophysics, IRAP.Student: Carlos Henrique Brandt. Thesis title: A deep X-ray view of Stripe-82: Improving the data legacy in the search for new blazars. SapienzaUniversityofRome, Italy (2018).

III b. Outside ICRANet

IV. Other

2019List of Publication

Science	[1] **Neutrino emission from the direction of the blazar TXS 0506+056 prior to the IceCube-170922A alert**; IceCube Collaboration, P. Giommi, P. Padovani,B. Arsioli, et al. Science 361, 147-151 (2018). arXiv:1807.08794 DOI: 10.1126/science.aat2890
MNRAS	[2] **Machine Learning applied to Multifrequency Data in Astrophysics: Blazar Classification;**B. Arsioliand P. Dedin; Vol 498, Issue 2, 1750–1764 (2020). arxiv:2005.03536 DOI: 10.1093/mnras/staa2449 [3]**Extreme& High Synchrotron Peak gamma-ray blazars beyond 4FGL: The 2BIGB gamma-ray catalog;**Bruno Arsioli, Y-L Chang, B. Musiimenta, MNRAS, 493, Issue 2, 2438–2451 (2020). arxiv:1911.08912 DOI:10.1093/mnras/staa368 [4] **Dissecting the region around IceCube-170922A: the blazar TXS 0506+056 as the first cosmic neutrino source**; P. Padovani, P. Giommi, E. Resconi, T. Glauch, B. Arsioli, N. Sahakyan, M. Huber; MNRAS 480, Issue 1, 192–203 (2018). arXiv:1807.04461 DOI: 10.1093/mnras/sty1852 [5] **Extreme & High Synchrotron Peaked Blazars at the limit of Fermi-LAT detectability: The γ-ray spectrum of 1BIGB sources**; B. Arsioli, U. Barres de Almeida, E. Prandini, B. Fraga, L. Foffano; MNRAS 480, Issue 2, 2165–2177 (2018). arXiv:1804.08801 DOI: 10.1093/mnras/sty1975 [6] **Extreme blazars as counterparts of IceCube astrophysical neutrinos**; P. Padovani, E. Resconi, P. Giommi, B. Arsioli, Y. L. Chang; MNRAS 457, Issue 4, 3582–3592 (2016). arXiv:1601.06550 DOI: 10.1093/mnras/stw228

Astronomy&astrophysics	[7] **The 3HSP catalog of Extreme & High Synchrotron Peaked Blazars**; Y-L Chang, B. Arsioli, P. Giommi, P. Padovani, C. H. Brandt; A&A, 632, A77 (2019). arXiv:1909.08279 DOI: 10.1051/0004-6361/201834526 [8] **The γ-ray emitting region in low synchrotron peak blazars. Testing self-synchrotron Compton and external Compton scenarios**; B. Arsioli, Y-L. Chang; A&A 616, A63 (2018). arXiv:1804.09761 DOI: 10.1051/0004-6361/201833005 [9] **A complete sample of LSP blazars fully described in γ-rays. New γ-ray detections and associations with Fermi-LAT**; B. Arsioli, G. Polenta; A&A 616, A20 (2018). arXiv:1804.03703 DOI: 10.1051/0004-6361/201832786 [10] **Searching for γ-ray signature in WHSP blazars: Fermi-LAT detection of 150 excess signal in the 0.3-500 GeV band**; B. Arsioli, Y-L Chang; A&A 598, A134 (2017). arXiv:1609.08501 DOI: 10.1051/0004-6361/201628691 [11] **2WHSP: A multi-frequency selected catalog of HE and VHE gamma-ray blazars and blazar candidates**; Y-L Chang, B. Arsioli, P. Giommi, P. Padovani; A&A 598, A17 (2017). arXiv:1609.05808 DOI: 10.1051/0004-6361/201629487 [12] **1WHSP: an IR-based sample of ~1,000 VHE γ-ray blazar candidates**; B. Arsioli, B. Fraga, P. Giommi, P. Padovani, P. M. Marrese, A&A 579, A34 (2015). arXiv:1504.02801 DOI: 10.1051/0004-6361/201424148
proceedings	[P1] **A search for new gamma-ray blazars from infrared selected candidates**; B. Musiimenta, B. Arsioli et al., Nuclear activity in galaxies across cosmic time Proceedings IAU Symposium No. 356 (2019). arxiv: 2004.06476 [P2] **Search for WHSP γ-ray counterparts within Fermi-LAT data: Solving a case of source confusion**; B. Arsioli, Y-L. Chang; Proceedings for The Fourteenth Marcel Grossmann Meeting, pp. 3105-3113; Rome, Italy (2017). DOI: 10.1142/9789813226609_0394 [P3] **Detecting New gamma-ray Sources Based on Multi-frequency Data: The Case of 1WHSP J031423.9+061956**; B. Arsioli, Y-L. Chang; API Conference Proceedings 1693 for the 2nd Cesar Lattes Meeting; Rio de Janeiro, Brazil (2015). DOI: 10.1063/1.4937209 [P4] **The Role of Higher Diffraction Order to Determine Ion Temperature in Vacuum Ultraviolet Region Using Multichannel Detector**; M. Machida, B. S. Arsioli, F. Nascimento, A. M. Daltrini, J. H. F. Severo, Ivan C. Nascimento; J. Plasma Fusion Research Series, Vol. 8 (2009).

Wu Yuanbin

January 2021

Position: PhD student
Period covered: 2011-2014

Current Position: Postdoc
Max Planck Institute for Nuclear Physics,
Heidelberg, Germany
2014-Now

I Scientific Work

Work in collaboration with ICRANet during my PhD studies:

- 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 compressed, superheavy 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

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

List of Publication

- Paul Hill, Yuanbin Wu, *Exploring laser-driven neutron sources for neutron capture cascades and the production of neutron-rich isotopes*, Phys. Rev. C 103, 014602 (2021).
- Yuanbin Wu, *Neutron production from thermonuclear reactions in laser-generated plasmas*, Phys. Plasmas 27, 022708 (2020).
- Yuanbin Wu, Christoph H. Keitel, Adriana Pálffy, *X-ray-assisted nuclear excitation by electron capture in optical laser-generated plasmas*, Phys. Rev. A 100, 063420 (2019).
- Yuanbin Wu, Christoph H. Keitel, Adriana Pálffy, *^{93m}Mo isomer depletion via beam-based nuclear excitation by electron capture*, Phys. Rev. Lett. 122, 212501 (2019).
- Jonas Gunst, Yuanbin Wu, Christoph H. Keitel, Adriana Pálffy, *Nuclear excitation by electron capture in optical-laser-generated plasmas*, Phys. Rev. E 97, 063205 (2018).
- Yuanbin Wu, Jonas Gunst, Christoph H. Keitel, Adriana Pálffy, *Tailoring laser-generated plasmas for efficient nuclear excitation by electron capture*, Phys. Rev. Lett. 120, 052504 (2018).
- Yuanbin Wu, Adriana Pálffy, *Determination of plasma screening effects for thermonuclear reactions in laser-generated plasmas*, Astrophys. J. 838, 55 (2017).
- Jonas Gunst, Yuanbin Wu, Naveen Kumar, Christoph H. Keitel, Adriana Pálffy, *Direct and secondary nuclear excitation with x-ray free-electron lasers*, Phys. Plasmas 22,112706 (2015).
- Yuan-Bin Wu, *On the surface tension and Coulomb energy of neutron star matter*, J. Korean Phys. Soc. 65, 850 (2014) [Special Issue on The 13th Italian-Korean Symposium on Relativistic Astrophysics].
- Yuan-Bin Wu, She-Sheng Xue, *Nonlinear Breit-Wheeler process in the collision of a photon with two plane waves*, Phys. Rev. D 90, 013009 (2014).
- Jorge A. Rueda, Remo Ruffini, Yuan-Bin Wu, She-Sheng Xue, *Surface tension of the core-crust interface of neutron stars with global charge neutrality*, Phys. Rev. C 89, 035804 (2014).
- Remo Ruffini, Yuan-Bin Wu, She-Sheng Xue, *Einstein-Euler-Heisenberg Theory and Charged Black Holes*, Phys. Rev. D 88, 085004 (2013).

- Yuquan Wu, Xiaofei Wang, Yuanbin Wu, *et al.*, *Properties of localization in silicon-based lattice periodicity breaking photonic crystal waveguides*, AIP Advances 3, 112107 (2013).
- Guo-Zhu Ning, Yuan-Bin Wu, *Neutrino Mass from a Higher-Dimensional Operator*, Chin. Phys. Lett. 28, 061402 (2011).
- Y. B. Wu, Y. F. Wang, and 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).
- Y. B. Wu, Y. F. Wang, and X. W. Cao, *Theoretical study of enhanced Raman scattering for stratified concentric silicon-silver nanocylinders*, J. Appl. Phys. 105, 023103 (2009).

CAPES

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

Work experiences

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. RI.BA. 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

Education and training

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 Sujects	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
English	Indipendent User
French	Basic User

Social skills and competences	Communication Ability acquired during the working experiences Aptitude to learn, adaptable to new situations, different from the known ones. Ability to work under pressure. Good aptitude to work in multicultural environment thanks to the experiences spent abroad for education or personal reasons. Team spirit
Organisational skills and competences	Innate sense of organisation both in the working place and in the management of personal and familiar life. I am considered as a reference point by the production operators.
Technical skills and competences	Mastery in quality control processes in small enterprises (I was responsible for the qualily evaluation)
Computer skills and competences	Good Knowledge of Microsoft Office (Word, Excel e PowerPoint) Very good knowledge of Team System – Gamma, Mult program Basic knowledge of graphic application Good knowledge of Internet and web search engines.

Gabriele Attilio Brandolini

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Fax	+39 085 4219252
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 F.lli 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
English	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.

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 Aveinda 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 (Governamental 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 *Languages for international communication – Portugues EU/BR and Spanish*
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 *Linguistic and Cultural Mediation Sciences – Portugues EU/BR and Spanish*
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
Portuguese	Second language
Spanish	Very good
English	Good
French	Basic User

Social skills and competences	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.

Organisational skills and competences	Very good sense of organisation and time planning abilities; Self rigorousness and self discipline; 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)
Computer skills and competences	Very good command of Microsoft Office (Word, Excel e PowerPoint); Very good knowledge of Internet and web search engines; Knowledge of graphic application.

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: "*La leva finanziaria e la leva operative nel settore pastario*" (supervisor Prof. Michele A. Rea)
• Mark	110/110 *cum laude*

• 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: "*Gli strumenti di analisi strategica: l'analisi SWOT"* (supervisor Prof. Michele A. Rea)
• Mark	106/110

• Date	09/1996 – 07/2001
• Institution	Secondary School focusing on sciences- Liceo Ginnasio Statale "Publio Virgilio Marone" Vico del Gargano (FG)
• Main Subjects	Mathematics analysis, Italian language and literature, Latin language and literature, Chemistry, Physics
• Achieved Qualification	Scientific school-leaving certificate
• Mark	100/100

FOREIGN LANGUAGES	
MOTHER-TONGUE	ITALIAN
OTHER LANGUAGES	ENGLISH (GOOD) – FRENCH (ELEMENTARY)
RELATIONAL ABILITIES	Good relational abilities thanks to the past work experience at DelVerde and to the present experience at ICRANet. Self-reliant. Good listener.
ORGANIZING COMPETENCES	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.
TECHNICAL SKILLS	Computers competences: Windows. Softwares: Word, Excel, Power Point. Very good use of Internet and e-mail accounts. Good use of cost-accounting system HELPAZI and bank system BNL Businessway. Elementary knowledge of HTML e CSS programs for websites. Knowledge of "TOP VALUE" program for financial diagnosis and corporate planning.
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.

INFORMAZIONI PERSONALI

Elisabetta Natale

Via Cesare Battisti 12, 65029, Torre de' Passeri (PE)

+39 3389465580

elynatale@hotmail.com

Data di nascita 07/11/1991 | Nazionalità Italiana

ESPERIENZA PROFESSIONALE

Da 01/2018 →

ICRANet Secretariat

International Center for Relativistic Astrophysics Network (ICRANet), Pescara

Da 09/2017 a 12/2017 →

Europe and North America Desk Assistant

UNESCO, Parigi

Relazione con Stati membri e Partner istituzionali (MSP), settore Relazioni estere e Public information and communication (ERI)

Da 03/2017 a 09/2017

HR & Project Assistant Intern

INTERSOS, Roma

Da 08/2016 a 02/2017

Intern – Delegazione dell'Unione Europrea presso Agenzie delle Nazioni Unite (FAO, IFAD, WFP), Santa Sede, Ordine di Malta e Repubblica di San Marino

EEAS (European External Action Service), Roma

- Sezione rapporti Unione Europea – ONU, in particolare responsabile delle relazioni UE - FAO
- Partecipazione ai principali meeting FAO in qualità di delegata UE
- Organizzazione e coordinamento dei meeting tra i 28 stati membri, analisi e preparazione di documenti e statement per i meeting
- Assistente sezione stampa e comunicazione, cura del sito web della Delegazione
- Stesura di comunicati stampa e report per gli uffici UE a Bruxelles, in particolare per la Commissione Europea e le DG pertinenti

Da 06/2016 a 08/2016

Marketing assistant

General Communication Srl Bologna, Bologna

- Ricerca e fidelizzazione di nuovi clienti per conto di ONGs e INGOs (AMNESTY INTERNATIONAL, UNICEF, AISM Onlus)
- Project Assistant

06/2016

Exit poll e proiezioni elettorali per elezioni amministrative Bologna 2016

IPR marketing per conto di RAI radiotelevisione italiana spa, Bologna

- Raccolta dati, monitoraggio, analisi e statistiche per proiezioni elettorali
- Trasmissione dei dati a RAI radiotelevisione italiana per immediata diffusione in tempo reale

04/2016

Scrutatrice per il referendum popolare italiano del 17 aprile 2016

Comune di Torre de' Passeri (PE)

Da 09/2015 a 11/2015

Administrative assistant Intern

Centro linguistico d'ateneo (CLA) Ravenna - Alma Mater Studiorum università di Bologna

- Attività di front/ back office, traduttrice per gli studenti stranieri in arrivo
- Preparazione e correzione dei test di livello linguistici (inglese, francese, tedesco e spagnolo)
- Assistente all'insegnamento per il progetto "ALMA ENGLISH" e per le certificazioni linguistiche
- Assistente all'insegnamento della lingua italiana per studenti stranieri
- Assistente sezione comunicazione

Da 11/2013 a 04/2014

Administrative assistant Intern

Ufficio orientamento e career service Forlì, Alma Mater Studiorum università di Bologna,Campus di Forlì (FC)

- Creazione e aggiornamento dei database
- Attività di front/ back office
- Colloqui con gli studenti per l'orientamento in entrata ed in uscita
- Promozione dell'attività formativa dell' Alma Mater Studiorum
- Assistente sezione comunicazione

Da 20/03/2014

Co-founder associazione IAPSS sezione di Forlì

IAPSS (International Association for Political Science Students), Forlì (FC)

- Cofondatrice dell'associazione
- Presentazione di IAPSS a istituzioni accademiche e amministrative (Alma Mater Studiorum - UniBo, comune di Forlí,…)
- Organizzazione di conferenze a livello locale / nazionale e internazionale
- Organizzazione di conferenze, eventi, round-tables, workshops, viaggi studio e di approfondimento
- Assistente sezione stampa e comunicazione

03/ 2010

Traduttrice DE> IT del materiale informativo relativo al XXXVII Congresso nazionale su "KANT E L'AUFKLÄRUNG"

Società filosofica italiana, Sulmona (L'AQ)

Traduzione di discorsi, flyer, documenti e materiale informativo relativo al XXXVII Congresso nazionale della "KANT E L'AUFKLÄRUNG"

ISTRUZIONE E FORMAZIONE

02/ 2017

Workshop in International Journalism and Communication

The Post Internazionale and Limes, Roma (RM)

Panelists: Enrico Mentana, Curzio Maltese, Marco Damilano, Amedeo Ricucci, Emiliano Fittipardi, Stefano Mentana, Giulio Gambino, Alessio Romenzi, Francesca Mannocchi, Nancy Porsia, Eva Giovannini, Sabika Shaha Povia, Laura Silvia Battaglia.

Da 04/2016 a 08/2016

Executive master in International Business Development (percorso Export management e internazionalizzazione d'impresa)

Sida group Management Academy, Bologna (BO)

Principali tematiche trattate: Strategie per l'internazionalizzazione d'impresa; marketing analitico e operativo; web marketing; social media marketing; project management; supply chain management e disciplina doganale; bilancio aziendale; controllo di gestione, pianificazione e strategia aziendale; business plan e finanziamenti; fiscalità e contrattualistica internazionale; tutela di marchi e brevetti; pagamenti internazionali e gestione del credito; analisi di mercato.

06/2016

Diploma congiunto NATO Allied commander transformation-UNIBO

NATO summer workshop and NATO Model event, Forlì (FC)

"NATO and Security Challenges: Institutions and Policies, Key Trends and Best Practices"

Ruolo ricoperto: giornalista NATO

Principali tematiche: Changing balances and the role of NATO in international politics: current challenges and

future opportunities; NATO in the future; Cooperative Security: Nato Partnerships in Perspective; Collective Defence and Crisis Management – Art.5 and Beyond; NATO and Other Actors in the New Security Environment: NATO and the UN'; NATO and the EU; Cybersecurity: Myth and Reality; The changing global security environment: Exploring new challenges and opportunities.

Da 09/2014 a 06/2015

Erasmus +

Institut d'études politiques (SCIENCES PO), Lione, Francia

Specializzazione nel percorso Affari internazionali e commerciali

Principali tematiche: Politique commerciale européenne et comparée; Pratiques du commerce international; Médias, pouvoir et construction du consensus politique ; Communication politique et publique; Théorie et pratiques de la diplomatie; Violence internationale et gestion des conflits; Politiques publiques; Histoire internationale.

Da 09/2013 a 03/2016

Laurea magistrale in scienze internazionali e diplomatiche
Curriculum: politica e sicurezza internazionale

Votazione: 110 con lode /110

Alma Mater Studiorum università di Bologna, Campus di Forlì

Redazione della tesi sperimentale in lingua francese, dal titolo «*L'outrecuidance «à la française»: paradoxes stratégiques et ambigüités historiques de la politique européenne et de défense de la France* ».

Attività extracurriculari:

- Co-fondatrice dell'associazione IAPSS (International Association For Political Science Students)
- 07/05/2014: SEMINAR "The Ukrainian Warfare: historical path and future implications to the International System" (organizzatrice)
- 11/04/2014: Incontro "Percorsi verso le carriere internazionali-da scienze politche al mondo globale", Campus di Forlì
- 06/03/2014: simulazione del Consiglio dell'UE nella formazione Occupazione e Affari Sociali (Forlì) – Ruolo: Germania

Da 09/2010 a 07/2013

Laurea in scienze internazionali e diplomatiche

Alma Mater Studiorum università di Bologna, Campus di Forlì

Attività extracurriculari:

- 05/2013: NATO Model Event (Forlì) - Ruolo: Ambasciatrice della Lituania
- 10/05/2013: "Croatian Membership in the New Europe", conferenza con l'Ambasciatore croato in Italia, Damir Grubiša, Punto Europa (Forlì)
- 12/04/2013: incontro ISPI "GLOBE, orientamento alle carriere internazionali", Campus di Forlì
- 07/03/2013: "L'Emilia nel cuore dell'Europa. Emigrazione in Belgio. Storia e memorie di molte partenze e di qualche ritorno", presentazione del libro del professor Lorenzo Bertuccelli, Punto Europa (Forlì)
- 02/2013: Prague Model United Nations Conference (Praga) - Ruolo: delegata della Mongolia nel Consiglio economico sociale Onu (ECOSOC)
- 13/03/2012: Cerimonia di consegna del Sigillum Magnum a Jean-Claude Juncker, Romano Prodi e Helmut Kohl, Bologna

Da 09/2005 a 07/2010

Maturità linguistica

Liceo linguistico Gian Battista Vico, Sulmona (L'AQ)

Lingue di studio: inglese, francese e tedesco

Scambi culturali:

- 10/2008: scambio culturale in Germania, liceo "Kurfurst Maximilian Gymnasium" Burghausen (Salzach)
- 03/2008: scambio culturale in Francia, liceo "Jean Zay", Jarny (Lorraine)

COMPETENZE PERSONALI

Lingua madre: Italiano

Altre lingue

	COMPRENSIONE		PARLATO		PRODUZIONE SCRITTA
	Ascolto	Lettura	Interazione	Produzione orale	
Inglese	C1/C2	C1/C2	C1/C2	C1/C2	C1/C2
Francese	C1/C2	C1/C2	C1/C2	C1/C2	C1/C2
Tedesco	B1/B2	B1/B2	B1/B2	B1/B2	B1/B2
Russo	B1	B1	B1	B1	B1
Spagnolo	A2	A2	A2	A2	A2

Competenza digitale

AUTOVALUTAZIONE				
Elaborazione delle informazioni	Comunicazione	Creazione di Contenuti	Sicurezza	Risoluzione di problemi
Utente intermedio	Utente intermedio	Utente intermedio	Utente intermedio	Utente intermedio

Altre competenze

- Corsi CRI (Pioniere e Volontaria del soccorso della Croce Rossa Italiana, corso BLSD e abilitazione all'utilizzo del defibrillatore semi automatico esterno)
- Attività sportiva agonistica (Federazione italiana Pentathlon moderno_ società sportiva Valpescara srl)
- Educatrice in Azione Cattolica e accompagnatrice/organizzatrice di campi estivi parrocchiali
- Aiuto nel doposcuola parrocchiale e ripetizioni private (saltuariamente).
- Conoscenza del sistema di scrittura e di lettura Braille

Patente di guida

B

ULTERIORI INFORMAZIONI

Progetti

GENERAZIONE ITALIA - Progetto di formazione istituzionale e innovazione legislativa organizzato dalla FONDAZIONE CULTURA DEMOCRATICA e dal GOVERNO ITALIANO
Roma, 04 -08/ 2017

Riconoscimenti e premi

- Luglio 2015: attestato di merito per studenti meritevoli, Alma Mater Studiorum Università di Bologna
- 11/12/2010: Borsa di studio per conseguimento del diploma con esito eccellente, elargita dal "Centro studi Mac 47, Carmine Mastrogiuseppe no profit", Sulmona (L'AQ)
- 08/2010: Segnalazione da parte del Dirigente Scolastico del liceo G.B.Vico (Sulmona-L'AQ) per rappresentare la scuola e partecipare al Premio "Alfieri del Lavoro" e alle prove di ammissione nel Collegio Universitario Lamaro Pozzani di Roma, realizzate dalla Federazione Nazionale dei Cavalieri del Lavoro
- 05/2001: Riconoscimento ed elezione alla carica di Consigliere nel Consiglio comunale dei bambini di Torre de' Passeri (PE)

Certificazioni

- Luglio 2016: CORSO DI FORMAZIONE GENERALE PER I LAVORATORI secondo il D.Lgs. 81/2008 e l'accordo Stato Regioni del 21/12/2011

Autorizzo il trattamento dei miei dati personali ai sensi del Decreto Legislativo 30 giugno 2003, n. 196 "Codice in materia di protezione dei dati personali".

Pescara, 18/01/2018

Elisabetta Natale