Staff, Visiting Scientists and Graduate Students at the Pescara Center

December 2011

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ICRANet Faculty Staff

Belinski Vladimir	ICRANet
Bianco Carlo Luciano	University of Rome "Sapienza" and ICRANet
Einasto Jaan	Tartu Observatory, Estonia
Novello Mario	*Cesare Lattes-ICRANet Chair* CBPF, Rio de Janeiro, Brasil
Rueda Jorge A.	University of Rome "Sapienza" and ICRANet
Ruffini Remo	University of Rome "Sapienza" and ICRANet
Vereshchagin Gregory	ICRANet
Xue She-Sheng	ICRANet

Adjunct Professors Of The Faculty

Aharonian Felix Albert	*Benjamin Jegischewitsch Markarjan Chair* Dublin Institute for Advanced Studies, Dublin, Ireland Max-Planck-Institut für Kernphysis, Heidelberg, Germany
Amati Lorenzo	Istituto di Astrofisica Spaziale e Fisica Cosmica, Italy
Arnett David	*Subramanyan Chandrasektar- ICRANet Chair* University of Arizona, Tucson, USA
Chakrabarti Sandip P.	Centre for Space Physics, India
Chardonnet Pascal	Université de la Savoie, France
Chechetkin Valeri	*Mstislav Vsevolodich Keldysh-ICRANet Chair* Keldysh institute for Applied Mathematics Moscow, Russia
Damour Thibault	*Joseph-Louis Lagrange- ICRANet Chair* IHES, Bures sur Yvette, France
Della Valle Massimo	Osservatorio di CapodiMonte, Italy
Everitt Francis	*William Fairbank-ICRANet Chair* Stanford University, USA
Fang Li-Zhi	*Xu-Guangqi-ICRANet Chair* University of Arizona, USA
Frontera Filippo	University of Ferrara, Italy
Jantzen Robert	*AbrahamTaub-ICRANet Chair* Villanova University USA
Kerr Roy	*Yevgeny Mikhajlovic Lifshitz-ICRANet Chair* University of Canterbury, New Zealand
Kleinert Hagen	*Richard Feynmann-ICRANet Chair* Freie Universität Berlin
Madey John	*William Fairbank-ICRANet Chair* University of Hawaii
Misner Charles	*John Archibald Wheeler* University of Maryland
Nicolai Hermann	Albert Einstein Institute – Potsdam, Germany
Pian Elena	INAF and Osservatorio Astronomico di Trieste
Popov Vladimir	ITEP, Russia

Punsly Brian Matthew	Mathew California University, Los Angeles USA
Quevedo Hernando	Institute of Nuclear Science, UNAM
Rosati Piero	European Southern Observatory, Germany
Rosquist Kjell	*Karl Gustav Jacobi-ICRANet Chair* Stockholm University, Sweden
t Hooft Gerard	*(Nobel Laureate)* Institut for Theoretical Physics Utrecht Universiteit, Holland
Titarchuk Lev	US Naval Laboratory, USA

Lecturers

Aksenov Alexey	Institute for Theoretical and Experimental Physics
Alekseev Georgy	Steklov Mathematical Institute-Russian Academy of Sciences
Bini Donato	CNR and ICRANet, Italy
Boccaletti Dino	ICRANet and Università di Roma "Sapienza"
Chen Pisin	National Taiwan University
Chieffi Alessandro	INAF, Rome, Italy
Coullet Pierre	Université de Nice - Sophia Antipolis, France
Di Castro Carlo	Università di Roma "Sapienza", Italy
Filippi Simonetta	ICRANet and Campus Biomedico, Italy
Jing Yi-Peng	Shangai Astronomy Observatory
Lee Chul Hoon	Hanyang University, Korea
Kim Sang Pyo	Kunsan National University, Korea
Kim Sung-Won	Institute of Theoretical Physics for Asia-Pacific, Korea
Lee Hyun Kyu	Department of Physics, Hanyang University,
Lee Hyung Won	School of Computer Aided Science, Inje, Korea
Limongi Marco	INAF, Rome, Italy
Lou You Qing	Tsinghua University, Beijing
Malheiro Manuel	ITA, Brazil
Mester John	Stanford University, USA
Mignard François	Observatoire de la Côte d'Azur, Nice, France
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 Roma
Sepulveda Alonso	University of Antioquia, Colombia
Song Doo Jong	National Institute of Astronomy, Korea

Starobinsky Alexei	Landau Institute for Theoretical Physics, Russia
Vissani Francesco	Gran Sasso National Laboratories, Italy
Wiltshire David	University of Canterbury, New Zealand

Research Scientists

Bernardini Maria Grazia	ICRANet and Università di Roma “Sapienza”, Italy
Caito Letizia	ICRANet and Università di Roma “Sapienza”, Italy
Cherubini Christian	Campus Biomedico, Rome, Italy
Geralico Andrea	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

Short-Term Visiting Scientists

Ahmedov Bobomurat	Uzbekistan Academy of Sciences
Ansoldi Stefano	University of Udine, Italy
Bisnovaty-Kogan Gennady	Space Research Institute - Russian Academy of Sciences
Cadez Andrej	University of Ljubljana, Slovenia
Gao Yu	Purple Mountain Observatory, China
Cho Yongmin	UNIST
De Lorenci Vitorio	Federal University Of Itajuba - Brazil
Kim Hongsu	KASI
Kim Hyeong-Chan	Chungju National University
Kim Jin Young	Kunsan National University
Lee Chang-Hwan	Pusan National University
Lee Wonwoo	Cquest, Sogang University
Manchester Richard	Australia Telescope National Facility, CSIRO
Manreza Paret Daryel	Universidad de La Habana - Cuba
Nagataki Shigehiro	YITP, Kyoto University, Japan
Negreiros Rodrigo Picanço	Frankfurt Institute for Advanced Studies
Park Ilhung	Ieu, Ewha Womans University
Park Myeong-Gu	Kyungpook National University
Piechocki Wlodzimierz	Institute for Nuclear Studies - Poland
Pinto-Neto Nelson	CBPF
Qadir Asgar	National University Of Sciences And Technology,Pakistan
Rishi Ram Paudel	Tribhuvan University, Nepal
Sasaki Misao	Kyoto University, Japan
Stanley Davis	Universite Bordeaux, France
Tarasenko Aleksander	Belarusian State University
Yang Jongmann	Ieu, Ewha Womans University
Yeom Dong-Han	Cquest, Sogang University

Long-Term Visiting Scientists

Arkhangekskaja Irene	Moscow Engineering Physics Institute, Russia
Bavarsad Ehsan	Isfahan University of Technology, Pakistan
Bittencourt Eduardo	CBPF, Brasil
Fimin Nicolaj	Keldysh institute for Applied Mathematics, Russia
Gadri Mohamed	University of Tripoli Libya
Gert Hutsi	Tartu Observatory, Estonia
Goulart Erico	CBPF, Brasil
Hoang Ngoc- Long	IPE, Hanoi, Vietnam
Mohammadi Rohollah	Isfahan University of Technology, Pakistan
Mosquera Cuesta Herman	CBPF, Brasil
Motie Iman	Isfahan University of Technology, Pakistan
Torres Sergio	Centro Internacional de Fisica, Bogotà Colombia
Zalaletdinov Roustam	Dept. of Theoretical Physisc, Institute of Nuclear Physics

International Relativistic Astrophysics Ph. D.

First Cycle	*2002-05*
Peirani Sebastien	France

Second Cycle	*2003-06*
Bernardini Maria Grazia	Italy
Mattei Alvise	Italy
Mercuri Simone	Italy

Third Cycle	*2004-07*
Chiappinelli Anna	France
Cianfrani Francesco	Italy
Guida Roberto	Italy
Rotondo Michael	Italy
Yegoryan Gegham	Armenia

Fourth Cycle	*2005-08*
Battisti Marco Valerio	Italy
Dainotti Maria.Giovanna	Italy
Khachatryan Harutyun	Armenia
Lecian Orchidea Maria	Italy
Pizzi Marco	Italy
Pompi Francesca	Italy

Fifth Cycle	*2006-09*
Caito Letizia	Italy
De Barros Gustavo	Brasil
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	Lebanon
Pugliese Daniela	Italy
Sigismondi Costantino	Italy

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

Eighth Cycle	*2009-2012*
Boshkayev Kuantay	Kazakhstan
Bravetti Alessandro	Italy
Ejlli Damian	Albania
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
Raponi, Andrea	Italy
Rau, Gioia	Italy
Wang Yu	China

IRAP Ph. D. Erasmus Mundus Students

First Cycle	*2010-2013*
Baranov Andrey	Russia
Benedetti Alberto	Italy
Dutta Parikshit	India
Fleig Philipp	German
Machado De Oliveira Fraga Bernardo	Brazil
Gruber Christine	Austria
Liccardo Vincenzo	Italy
Martins De Carvalho Sheyse	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
Bruno Sversut Arsioli	Brazil
Pereira, Jonas Pedro	Brazil
Pisani Giovanni	Italy
Rakshit Suvendu	India
Wu Yuanbin	China

Administrative and Secretarial Staff

Adamo Cristina	Administrative Office
Barbaro Pina	ICRANet Nice
Del Beato Annapia	Documentation Office
Di Berardino Federica	Head of the Secretarial Office
Latorre Silvia	Administrative Office
Regi Massimo	System Manager

Belinski Vladimir

Position: ICRANet, Faculty Member
Period covered: December 2010-December 2011

I. Scientific Work

Cosmology:
It was continuation of the work on the book "Cosmological Singularity" by V.Belinski and T.Damour as well as didactic and educational activity in relation to the BKL theory of the cosmological singularity (Ref.[1] and Ref.[2]).
Exact solutions of Einstein and Einstein-Maxwell equations:
1) The old problem of generation of the exact stationary axisymmetric solutions corresponding to the charged masses with horizons has been investigated in the framework of Inverse Scattering Method (ISM). It was shown that applicability of the ISM in presence of electromagnetic field is not restricted only to the cases with naked singularities (as it was erroneously stated by some authors). We showed that also solutions with horizon follows from ISM and they are of the same solitonic character. The mathematical procedure of analytical continuations of solitonic solutions in the space of their parameters in order to obtain solutions with horizon was constructed (Ref.[3]).
2) We propose the new derivation of the Kerr solution by adding to the Schwarzchild black hole the solitonic vortex made from the pure gravitational field. With this method, we can figure out how rotational energy can contribute to the mass of the resulting Kerr black hole. The interpretation of the extremal black hole as a whirl of pure gravity is proposed. Also we suggest a new point of view on the relation between the mass and angular momentum of a Kerr black hole (Ref.[4]).
Quantum Fields
1) It was shown that there is no way for particle creation to occur by quantum tunneling through an infinitesimal neighborhood of the black hole horizon. This result is the consequence of the regularity of the horizon, the equivalence principle and the general covariance of the relativistic theory of gravity. However, a more essential result that no particle creation by quantum tunneling through the black hole horizon is possible independent of the size of the presupposed tunneling domain was confirmed (Ref.[5]).

II. 2011 List of Publications

[1]. V.Belinski "On the Cosmological Singularity in General Relativity", IJMP(D), **20**, 1907 (2011).

[2]. V.Belinski "On the Singularity Phenomenon in Cosmology", Chapter 2 in: Cosmology and Gravitation: XIVth Brazilian School of Cosmology and Gravitation, edited by M.Novello and S.E.Perez Bergliaffa, Cambridge Scientific Publishers, 2011.

[3]. G.Alekseev and V.Belinski "Soliton Nature of Equilibrium State of Two Charged Masses in General Relativity", arXiv:gr-qc/1103.0582; IJMP(D) in press, (2011).

[4]. V. Belinski and H. W. Lee "Kerr rotation as solitonic whirl around Schwarzschild black hole", Nuovo Cimento, submitted December 2011.

[5]. V.Belinski "On tunneling through the black hole horizon", Physics Letters A376, 207 (2011); available on line: Physics Letters A (2011), doi:10.1016/j.physleta.2011.11.014.

III. <u>Conferences and educational activity</u>

Conferences:
12 Italian-Korean Symposium on Relativistic Astrophysics, 4-8 July, 2011, Pescara (Italy).
The talk: V. Belinski and H. W. Lee "Kerr rotation as solitonic whirl around Schwarzschild black hole."

3-nd Galileo-XuGuangqi Meeting, 11-15 October, 2011, Beijing (China).
Chairman of the parallel Session "Early Universe".
The talk: V.Belinski "Basic facts on the Cosmological Singularity".

Educational activity:
V.Belinski "On the tunneling through the black hole horizon", the course of 4 lectures for Erazmus Mundus Joint Doctorate Program, Nice University "Sophia Antipolis", Nice (France), 11-17 September, 2011.

IV. <u>Work with students:</u>
A.Bravetti (PhD degree under IRAP)

Bianco Carlo Luciano

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

Period covered: 2005 – present

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

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

Gave the following invited lectures:
- C.L. Bianco, M.G. Bernardini, P. Chardonnet, F. Fraschetti, R. Ruffini, S.-S. Xue; Our model for Gamma-Ray Bursts; *1st Bego scientific rencontre*, Université de Nice Sophia-Antipolis, Nice, France, 14 February 2006.
- C.L. Bianco; Equations of motion and beaming in Gamma – Ray Bursts; *1st Cesare Lattes Meeting*, Mangaratiba (RJ), Brazil, 1 March 2007.
- C.L. Bianco, M.G. Bernardini, L. Caito, M.G. Dainotti, R. Guida, R. Ruffini; Theoretical interpretation of GRB060614; *2007 April Meeting of the American Physical Society*; Jacksonville, Florida (USA), 14 April 2007.
- C.L. Bianco; The fireshell model and the canonical GRB scenario; *Scuola Nazionale di Astrofisica (National School of Astrophysics)* (II course, IX cycle); Venice (Italy), 18 September 2007.
- C.L. Bianco, M.G. Bernardini, L. Caito, M.G. Dainotti, R. Guida, R. Ruffini, G. Vereshchagin, S.-S. Xue; Equations of motion of the fireshell; *3rd Stueckelberg Workshop*; Pescara (Italy), 10 July 2008.
- C.L. Bianco, M.G. Bernardini, L. Caito, G. De Barros, L. Izzo, F.A. Massucci, B. Patricelli, R. Ruffini, G. Vereshchagin, S.-S. Xue; The fireshell equations of motion and equitemporal surfaces; *6th Italian-Sino Workshop*; Pescara (Italy), 29 June 2009.
- C.L. Bianco, M.G. Bernardini, L. Caito, G. De Barros, L. Izzo, B. Patricelli, R. Ruffini; The canonical GRB scenario within the fireshell model: "long", "genuine short" and "disguised short" GRBs; *GRB 2010: Dall'eV al TeV tutti i colori dei GRB – Secondo congresso italiano sui GRB*; Cefalù (Italy), 15 June 2010.
- A.G. Aksenov, M.G. Bernardini, C.L. Bianco, L. Caito, C. Cherubini, G. De Barros, A. Geralico, L. Izzo, F.A. Massucci, B. Patricelli, M. Rotondo, J.A. Rueda Hernandez, R. Ruffini, G. Vereshchagin, S.-S. Xue; New developments of the Fireshell scenario; *The Shocking Universe Meeting*, San Servolo, Venice (Italy), September 2009.
- C.L. Bianco, M.G. Bernardini, L. Caito, G. De Barros, L. Izzo, B. Patricelli, R. Ruffini; The fireshell equations of motion and the P-GRB observational properties; *2nd Galileo – Xu GuangQi meeting*, Ventimiglia (Italy), July 2010.
- C.L. Bianco, M.G. Bernardini, L. Caito, G. De Barros, L. Izzo, B. Patricelli, R. Ruffini; The fireshell model for GRBs: toward a canonical GRB scenario; *3rd Galileo – Xu GuangQi meeting*, Beijing (China), October 2011.

II b Work With Students
- Students of the IRAP-PhD program at University "La Sapienza", Rome, Italy: Maria Grazia Bernardini, Letizia Caito, Maria Giovanna Dainotti, Gustavo De Barros, Roberto Guida, Luca Izzo, Barbara Patricelli, Ana Virginia Penacchioni.
- Students of the First three years degree Thesis ("Tesi di Laurea triennale") in Physics at University "La Sapienza", Rome, Italy: Giulia De Rosi, Eliana La Francesca, Francesco Alessando Massucci, Federica Volpi.

– Students of the Final Degree Thesis ("Tesi di Laurea Vecchio Ordinamento") in Physics at University "La Sapienza", Rome, Italy: Letizia Caito, Walter Ferrara, Laura Rosano.

II c Diploma thesis supervision

- 2005. External supervisor of the First three years degree thesis ("Tesi di laurea triennale") in Physics by Francesco Alessandro Massucci at University "La Sapienza", Rome, Italy.
- 2006. External supervisor of the Degree thesis in Physics by Letizia Caito at University "La Sapienza", Rome, Italy.
- 2007. Thesis advisor of the IRAP-PhD Degree Thesis by Maria Grazia Bernardini at University "La Sapienza", Rome, Italy.
- 2008. External supervisor of the First three years degree thesis ("Tesi di laurea triennale") in Physics by Eliana La Francesca at University "La Sapienza", Rome, Italy.
- 2008. Thesis advisor of the IRAP-PhD Degree Thesis by Roberto Guida at University "La Sapienza", Rome, Italy.
- 2009. External supervisor of the Degree thesis in Physics by Laura Rosano at University "La Sapienza", Rome, Italy.
- 2010. Thesis advisor of the IRAP-PhD Degree Thesis by Letizia Caito at University "La Sapienza", Rome, Italy.
- 2010. External supervisor of the First three years degree thesis ("Tesi di laurea triennale") in Physics by Giulia De Rosi at University "La Sapienza", Rome, Italy.

II d Other Teaching Duties

- Assistant teacher in the course of "Laboratory of Electromagnetism and Circuits" by Prof. Giulio D'Agostini at Physics Department of the University "La Sapienza", Rome, Italy, academical year 2005/2006.
- Assistant teacher in the course of "Laboratory of Systems and Signals" by Prof. Mario Mattioli at Physics Department of the University "La Sapienza", Rome, Italy, academical years 2007/2008, 2008/2009, 2009/2010, 2010/2011, 2011/2012.

II e. Work With Postdocs

III. Service activities

III a. Within ICRANet

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

III b. Outside ICRANet

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

2011 List of Publications

RIVISTE SCIENTIFICHE INTERNAZIONALI CON REFEREE:

- M.G. BERNARDINI, C.L. BIANCO, L. CAITO, M.G. DAINOTTI, R. GUIDA, R. RUFFINI; GRB970228 in the "canonical GRB" scenario; *Journal of the Korean Physical Society*, **56**, 1575 (2010). <http://dx.doi.org/10.3938/jkps.56.1575>

- L. CAITO, M.G. BERNARDINI, C.L. BIANCO, M.G. DAINOTTI, R. GUIDA, R. RUFFINI; GRB060614: a preliminary result; *Journal of the Korean Physical Society*, **56**, 1579 (2010). <http://dx.doi.org/10.3938/jkps.56.1579>
- M.G. DAINOTTI, M.G. BERNARDINI, C.L. BIANCO, L. CAITO, R. GUIDA, R. RUFFINI; The astrophysical trypthic: GRB, SN and URCA can be extended to GRB060218?; *Journal of the Korean Physical Society*, **56**, 1588 (2010). <http://dx.doi.org/10.3938/jkps.56.1588>
- L. CAITO, L. AMATI, M.G. BERNARDINI, C.L. BIANCO, G. DE BARROS, L. IZZO, B. PATRICELLI, R. RUFFINI; GRB 071227: an additional case of a disguised short burst; *Astronomy & Astrophysics*, **521**, A80 (2010). <http://adsabs.harvard.edu/abs/2010A%26A...521A..80C> <http://dx.doi.org/10.1051/0004-6361/201014640>
- L. IZZO, M.G. BERNARDINI, C.L. BIANCO, L. CAITO, B. PATRICELLI, R. RUFFINI; GRB 090423 at Redshift 8.1: a Theoretical Interpretation; *Journal of the Korean Physical Society*, **57**, 551 (2010). <http://dx.doi.org/10.3938/jkps.57.551>
- G. DE BARROS, L. AMATI, M.G. BERNARDINI, C.L. BIANCO, L. CAITO, L. IZZO, B. PATRICELLI, R. RUFFINI; On the nature of GRB 050509b: a disguised short GRB; *Astronomy & Astrophysics*, **529**, A130 (2011). <http://adsabs.harvard.edu/abs/2011A%26A...529A.130D> <http://dx.doi.org/10.1051/0004-6361/201116659>
- C.L. BIANCO, F.A. MASSUCCI, R. RUFFINI; The luminosity evolution over the equitemporal surfaces in the prompt emission of gamma-ray bursts; *International Journal of Modern Physics D*, **20**, 1919 (2011). <http://dx.doi.org/10.1142/S0218271811019943>
- L. CAITO, M.G. BERNARDINI, C.L. BIANCO, L. IZZO, B. PATRICELLI, R. RUFFINI; GRB 071227: another disguised short burst; *International Journal of Modern Physics D*, **20**, 1931 (2011). <http://dx.doi.org/10.1142/S0218271811019955>
- L. IZZO, M.G. BERNARDINI, C.L. BIANCO, L. CAITO, B. PATRICELLI, L.J. RANGEL LEMOS, R. RUFFINI; GRB 080916C and the high-energy emission in the fireshell scenario; *International Journal of Modern Physics D*, **20**, 1949 (2011). <http://dx.doi.org/10.1142/S0218271811019992>
- B. PATRICELLI, M.G. BERNARDINI, C.L. BIANCO, L. CAITO, L. IZZO, R. RUFFINI, G. VERESHCHAGIN; A new spectral energy distribution of photons in the fireshell model of GRBs; *International Journal of Modern Physics D*, **20**, 1983 (2011). <http://dx.doi.org/10.1142/S0218271811020056>

PROCEEDINGS:

- A.G. AKSENOV, M.G. BERNARDINI, C.L. BIANCO, L. CAITO, C. CHERUBINI, G. DE BARROS, A. GERALICO, L. IZZO, F.A. MASSUCCI, B. PATRICELLI, M. ROTONDO, J.A. RUEDA HERNANDEZ, R. RUFFINI, G. VERESHCHAGIN, S.-S. XUE; The fireshell model for Gamma-Ray Bursts; in *The Shocking Universe*, Proceedings of the conference held in Venice (Italy), September 2009, G. Chincarini, P. D'Avanzo, R. Margutti, R. Salvaterra, Editors; *SIF Conference Proceedings*, **102**, 451 (2010).
- M.G. BERNARDINI, C.L. BIANCO, L. CAITO, L. IZZO, B. PATRICELLI, R. RUFFINI; The end of the prompt emission within the fireshell model; in *The Shocking Universe*, Proceedings of the conference held in Venice (Italy), September 2009, G. Chincarini, P. D'Avanzo, R. Margutti, R. Salvaterra, Editors; *SIF Conference Proceedings*, **102**, 489 (2010).
- L. IZZO, M.G. BERNARDINI, C.L. BIANCO, L. CAITO, B. PATRICELLI, R. RUFFINI; GRB 090423 in the fireshell scenario; in *The Shocking Universe*, Proceedings of the conference held in Venice (Italy), September 2009, G. Chincarini, P. D'Avanzo, R. Margutti, R. Salvaterra, Editors; *SIF Conference Proceedings*, **102**, 537 (2010).
- B. PATRICELLI, M.G. BERNARDINI, C.L. BIANCO, L. CAITO, L. IZZO, R. RUFFINI, G. VERESHCHAGIN; A new spectral energy distribution of photons in the fireshell model of GRBs; in *The Shocking*

Universe, Proceedings of the conference held in Venice (Italy), September 2009, G. Chincarini, P. D'Avanzo, R. Margutti, R. Salvaterra, Editors; *SIF Conference Proceedings*, **102**, 559 (2010).

- C.L. BIANCO, M.G. BERNARDINI, L. CAITO, G. DE BARROS, L. IZZO, B. PATRICELLI, R. RUFFINI; Disguised Short Bursts and the Amati Relation; in *Deciphering the ancient universe with Gamma-Ray Bursts*, Proceedings of the conference held in Kyoto (Japan), April 2010, N. Kawai, S. Nagataki, Editors; *AIP Conference Proceedings*, **1279**, 299 (2010). <http://adsabs.harvard.edu/abs/2010AIPC.1279..299B> <http://dx.doi.org/10.1063/1.3509290>
- L. IZZO, M.G. BERNARDINI, C.L. BIANCO, L. CAITO, B. PATRICELLI, L.J. RANGEL LEMOS, R. RUFFINI; On GRB 080916C and GRB 090902B observed by the Fermi satellite; in *Deciphering the ancient universe with Gamma-Ray Bursts*, Proceedings of the conference held in Kyoto (Japan), April 2010, N. Kawai, S. Nagataki, Editors; *AIP Conference Proceedings*, **1279**, 343 (2010). <http://adsabs.harvard.edu/abs/2010AIPC.1279..343I> <http://dx.doi.org/10.1063/1.3509305>
- B. PATRICELLI, M.G. BERNARDINI, C.L. BIANCO, L. CAITO, G. DE BARROS, L. IZZO, R. RUFFINI; Black Holes in Gamma Ray Bursts; in *Deciphering the ancient universe with Gamma-Ray Bursts*, Proceedings of the conference held in Kyoto (Japan), April 2010, N. Kawai, S. Nagataki, Editors; *AIP Conference Proceedings*, **1279**, 406 (2010). <http://adsabs.harvard.edu/abs/2010AIPC.1279..406P> <http://dx.doi.org/10.1063/1.3509327>
- M.G. BERNARDINI, C.L. BIANCO, L. CAITO, M.G. DAINOTTI, R. GUIDA, R. RUFFINI; The GRB classification within the "fireshell" model: short, long and "fake" short GRBs; in *Proceedings of the 3rd Stueckelberg Workshop on Relativistic Field Theories*, Pescara, Italy, July 2008, N. Carlevaro, R. Ruffini, G.V. Vereshchagin, Editors; Cambridge Scientific Publishers, (UK, 2011).
- C.L. BIANCO, M.G. BERNARDINI, L. CAITO, M.G. DAINOTTI, R. GUIDA, R. RUFFINI, G.V. VERESHCHAGIN, S.-S. XUE; Equations of motion of the "fireshell"; in *Proceedings of the 3rd Stueckelberg Workshop on Relativistic Field Theories*, Pescara, Italy, July 2008, N. Carlevaro, R. Ruffini, G.V. Vereshchagin, Editors; Cambridge Scientific Publishers, (UK, 2011).
- L. CAITO, M.G. BERNARDINI, C.L. BIANCO, M.G. DAINOTTI, R. GUIDA, R. RUFFINI; GRB 060614: another example of "fake" short burst from a merging binary system; in *Proceedings of the 3rd Stueckelberg Workshop on Relativistic Field Theories*, Pescara, Italy, July 2008, N. Carlevaro, R. Ruffini, G.V. Vereshchagin, Editors; Cambridge Scientific Publishers, (UK, 2011).
- G. DE BARROS, M.G. BERNARDINI, C.L. BIANCO, L. CAITO, R. GUIDA, R. RUFFINI; Analysis of GRB 050509b; in *Proceedings of the 3rd Stueckelberg Workshop on Relativistic Field Theories*, Pescara, Italy, July 2008, N. Carlevaro, R. Ruffini, G.V. Vereshchagin, Editors; Cambridge Scientific Publishers, (UK, 2011).

Einasto Jaan

Research

In collaboration with Tartu and Potsdam astronomers I made several series of numerical simulations of structure evolution of the Universe. These simulations have several goals: to investigate the influence of density perturbations of different scale to structure formation and evolution, the role of phases to the formation of systems of galaxies of various scale, the absence of galaxies in voids etc. Simulations were made for several cube sizes: 64, 100, 256, 500, 768 Mpc/h, and resolutions 2563 and 5123 particles and cells. For all models simulations were performed with the full power spectrum, and with truncated spectra, where long-wave perturbations were cut at wavelenghts 8, 16, 32, 64, and 128 h−1 Mpc. Initial conditions (random numbers used to generate initial positions and velocities of particles) were identical in models of various cuts, this allows to identify particles in systems (halos), and to follow the behavior of halos in varying conditions.

The wavelet analysis of models leads us to the conclusion that the properties of the largescale cosmic web with filaments and voids depend on two connected properties of the evolution of density perturbations. The first property is the synchronisation of density waves of medium and large scales. Due to the synchronisation of density waves of different scales, positive amplitude regions of density waves add together to form rich systems of galaxies, and negative amplitude regions of density waves add together to decrease the mean overall density in voids. The amplification of density perturbations is another property of density evolution. Due to the addition of negative amplitudes of medium and large scale perturbations, there is no possibility for the growth of the initial small-scale positive density peaks in void regions. For this reason, small-scale protohaloes dissolve there. In the absence of medium and large-scale density perturbations, these peaks would contract to form haloes, which would also fill the void regions, i.e. there would be no void phenomenon as observed. The analys is published by Einasto et al. (2011a,b) and Suhhonenko et al. (2011). Results of this study have been discussed on the Warsaw workshop "Cosmic Web Morphology and Topology", and on the IRAP PhD Erasmus Mundus School, Nice. Our study of the evolution of density perturbations of various scales has led to the following conclusions:

• The formation of the cosmic web with filaments and voids is due to the synchronization of density waves of medium and large scales, and the amplification of both over- and under-dense regions.

• Voids are regions in space where medium- and large-scale density waves combine *in similar under-density phases*.

• Owing to phase synchronisation, the mean density of matter in void regions is below the mean density, thus initial small-scale perturbations cannot grow.

I participated in the analyze of the morphology of superclusters of galaxies in the Sloan Great Wall by Einasto et al. (2011d,c,f,e). Together with E. Tempel, E. Tago, E. Saar and other members of the Tartu Observatory cosmology group I participated in the study of the luminosity function of galaxies of the SDSS by Tempel et al. (2011).

Lectures, conferences

• February 09: talk on a conference dedicated to the opening of the AHHAA science education center "200 years of Tartu Observatory";

• April 28: talk on conference "Expanding the Universe", dedicated to the 200 anniversary of Tartu University Observatory – "Dark Matter" (Einasto, 2011);

• July 12: talk on Warsaw workshop "Cosmic Web Morphology and Topology" – "Formation of the cosmic web";

• August 08: talk on summer school – "Structure of the Universe";
• Lectures on the IRAP PhD Erasmus Mundus School, September 12 in Nice:
1. "Galactic models";
2. "Formation of the cosmic web";
3. "Evolution of the cosmic web".

Visits
• July 11 – 18: Warsaw, workshop "Cosmic Web Morphology and Topology";
• September 04 – November 07: Nice, Pescara ICRANet.

References

Einasto, J. 2011, *Dark matter*, ArXiv:1109.5580, 11
Einasto, J., H¨utsi, G., Saar, E., Suhhonenko, I., Liivam¨agi, L. J., Einasto, M., M¨uller, V., Starobinsky, A. A., Tago, E., & Tempel, E. 2011a, *Wavelet analysis of the cosmic web formation*, A&A, 531, A75+
Einasto, J., Suhhonenko, I., H¨utsi, G., Saar, E., Einasto, M., Liivam¨agi, L. J., M¨uller, V., Starobinsky, A. A., Tago, E., & Tempel, E. 2011b, *Towards understanding the structure of voids in the cosmic web*, A&A, 534, A128+
Einasto, M., Liivamagi, L. J., Saar, E., Einasto, J., Tempel, E., Tago, E., & Martinez, V. J. 2011c, *SDSS DR7 superclusters. Principal component analysis*, ArXiv: 1108.4372
Einasto, M., Liivam¨agi, L. J., Tago, E., Saar, E., Tempel, E., Einasto, J., Mart´ınez, V. J., & Hein¨am¨aki, P. 2011d, *SDSS DR7 superclusters. Morphology*, A&A, 532, A5+
Einasto, M., Liivam¨agi, L. J., Tago, E., Saar, E., Tempel, E., Einasto, J., Mart´ınez, V. J., & Hein¨am¨aki, P. 2011e, *SDSS DR7 superclusters. Morphology*, A&A, 532, A5+
Einasto,M., Liivam¨agi, L. J., Tempel, E., Saar, E., Tago, E., Einasto, P., Enkvist, I., Einasto, J., Mart´ınez, V. J., Hein¨am¨aki, P., & Nurmi, P. 2011f, *The Sloan Great Wall. Morphology and Galaxy Content*, ApJ, 736, 51
Suhhonenko, I., Einasto, J., Liivam¨agi, L. J., Saar, E., Einasto, M., H¨utsi, G., M¨uller, V., Starobinsky, A. A., Tago, E., & Tempel, E. 2011, *The cosmic web for density perturbations of various scales*, A&A, 531, A149+
Tempel, E., Saar, E., Liivam¨agi, L. J., Tamm, A., Einasto, J., Einasto, M., & M¨uller, V. 2011, *xy morphology, luminosity, and environment in the SDSS DR7*, A&A, 529, A53+

Rueda Hernández Jorge Armando

Position: *Assistant Professor at ICRANet*
Period covered: 2011-2014

I Scientific Work

- *Nuclear and Atomic Astrophysics:* We study the nuclear and atomic physics related to astrophysical systems as white dwarfs and neutron stars. We focus on the properties of nuclear matter under extreme conditions of density and pressure found in compact stars. The equations of state of matter in white dwarf and neutron star interiors are studied in detail taking into account all the interactions between the constituents within a full relativistic framework.
- *White Dwarf and Neutron Star Physics and Astrophysics:* The aim is to construct a self-consistent theory of self-gravitating systems obeying relativistic quantum statistics, electromagnetic, weak and strong interactions within the framework of general relativity. Such a theory is based on the general relativistic extension of the Thomas-Fermi model of the atom and on the relativistic generalization of the theory of Feynman, Metropolis and Teller on compressed atoms. Particular attention is given to the study of the effects of the electromagnetic interactions coupled to gravity, which lead to macroscopic gravito-polarization in neutron stars. In the case of white dwarfs, we study the macroscopic influence of the microphysical charge screening between the nuclei lattice and the electronic fluid. The structure properties e.g. the mass-radius relations of both white dwarfs and neutron stars are studied within the above framework. The effects of rotation as well as of high-temperatures on the structure of white dwarfs and neutron stars are also investigated.
- *Critical Fields in Neutron Stars and Black Holes:* We study the conditions under which critical electromagnetic fields can develop in neutron stars. The subsequent evolution of the electromagnetic fields in the collapse of a neutron star to a black hole is also investigated and applied to the physics of extreme astrophysical phenomena like Gamma-Ray-Bursts. The general properties of electrovacuum spacetimes e.g. the Kerr-Newman one are also studied from the theoretical point of view. In particular, the physics and astrophysics related to the dyadosphere of the Reissner-Nordstrom black hole and the dyadotorus of the Kerr-Newman black hole are addressed.
- *Exact Electrovacuum Solutions of the Einstein-Maxwell equations in Astrophysics:* We analyze the ability of analytic exact solutions of the Einstein-Maxwell equations to describe the exterior spacetime of compact stars like white dwarfs and neutron stars. The problem of matching between interior and exterior spacetimes is addressed in detail. The effect of the quadrupole moment on the properties of the spacetime is also investigated.

II Conferences and educational activities

II a. Conferences and Other External Scientific Work

- 3rd Galileo-Xu Guangqi Meeting, October 11-15, 2011 Beijing (China).
- 12th Italian-Korean Symposium on Relativistic Astrophysics, July 4-8, 2011 Pescara (Italy).
- 2nd International Symposium on Strong Electromagnetic Fields and Neutron Stars, May 5-7, 2011 Varadero (Cuba).
- 1st Caribbean Symposium on Nuclear and Astroparticle Physics, May 1-4, 2011 La Habana (Cuba).
- IRAP Ph.D. Erasmus Mundus Workshop ``From Nuclei to White Dwarfs and Neutron Stars'', April 3-8, 2011 Les Houches (France).
- IRAP Ph.D. Erasmus Mundus Workshop ``Recent News from the Mev, GeV and TeV Gamma-Ray Domains'', March 21-26, 2011 Pescara (Italy).
- 25th Texas Symposium on Relativistic Astrophysics, December 6-10, 2010 Heidelberg (Germany).

- 2nd Galileo-Xu Guangqi Meeting, July 12-18, 2010 Ventimiglia (Italy).
- 11th Italian-Korean Symposium on Relativistic Astrophysics, November 2-4, 2009 Seoul (Korea).
- 1st Galileo-Xu Guangqi Meeting, October 26-30, 2009 Shanghai (China).
- 12th Marcel Grossmann Meeting On General Relativity, July 12-18, 2009 Paris (France).
- 6th Italian-Sino Workshop on Relativistic Astrophysics, June 29-July 1, 2009 Pescara (Italy).
- 1st Sobral Meeting, May 26-29, 2009 Fortaleza (Brazil).
- 3rd Stueckelberg Workshop, July 8-18, 2008 Pescara (Italy).
- APS April meeting, April 12-15, 2008 Saint Louis (USA).
- 4th Italian-Sino Workshop on Relativistic Astrophysics, July 20-30, 2007 Pescara (Italy).
- 10th Italian-Korean Symposium on Relativistic Astrophysics, June 25-30, 2007 Pescara (Italy).
- 1st Cesare Lattes Meeting on Gamma Ray Bursts, Black Holes and Supernovae, February 25-March 3, 2007 Mangaratiba (Brazil).

II b. Work With Students

- *With Riccardo Belvedere (IRAP Ph. D student 3rd-year):* We construct neutron star equilibrium configurations by integrating numerically the set of self-consistent ground-state equilibrium equations for neutron taking into account quantum statistics, electromagnetic, weak, and strong interactions, within the framework of general relativity. The mass-radius of neutron stars is obtained for selected parameterizations of the nuclear model.
- *With Maria Haney (IRAP Ph. D student 3rd -year):* The Israel-Darmois formalism for the matching of spacetimes is applied to describe the boundary interface between the core and the crust of neutron stars, in the non-rotating as well in the rotating case.
- *With Kuantay Boshkayev (IRAP Ph. D student 3rd -year):* We study the equilibrium configurations of uniformly rotating white dwarfs and neutron stars within the Hartle formalism. Particular attention is given to the rotation instabilities of rapidly rotating stars e.g. mass-shedding and axisymmetric (secular) instabilities.
- *With Sheyse Martins de Carvalho (Erasmus Mundus Ph. D student 2nd-year):* We study the influence of the temperature on the properties of white dwarfs and neutron stars. The extension of the relativistic Feynman-Metropolis-Teller equation of state to the case of finite temperatures is studied. The results are applied to both white dwarfs and neutron stars. The effect of high-temperatures relevant to newly born neutron stars and to neo-neutron stars is also investigated. We study as well the effects of the temperature on the structure and on the gravito-polarization effects studied in the degenerate approximation of neutron stars.
- *With Carlos Arguelles (IRAP Ph. D student 1st-year):* We study analytic exact exterior solutions of the Einstein-Maxwell equations and their ability to describe the exterior spacetime of compact stars like neutron stars. The problem of matching between interior and exterior spacetimes is addressed within the Israel-Darmois formalism of junction conditions. We emphasize on the role of the quadrupole moment in the determination of the properties of both black holes and compact stars exterior spacetimes.

II c. Diploma thesis supervision

Sheyse Martins de Carvalho (Erasmus Mundus Ph. D student 1st-year): Ph. D Thesis: "On the electrodynamics of Neutron Stars". We extend our previous results on neutron stars by including the effects of finite temperatures. Furthermore, we construct new neutron star equilibrium configurations including a new equation of state for the crust of the neutron star, which fully treats the microscopic screening between the nucleus and the surrounding electrons in relativistic regimes and at finite temperatures.

2011 List of Publications

III a. Refereed Journals

- **Neutron star equilibrium configurations within a fully relativistic theory with strong, weak, electromagnetic, and gravitational interactions**, R. Belvedere, D. Pugliese, Jorge A. Rueda, R. Ruffini, and S.-S. Xue, submitted to Nuclear Physics A.

- **On the constitutive equations of a self-gravitating system of neutrons, protons and electrons in beta-equilibrium at finite temperatures**, M. Rotondo, Jorge A. Rueda, R. Ruffini, and S.-S. Xue, submitted to Physical Review D.
- **On the maximum mass and minimum period of general relativistic uniformly rotating white dwarfs**, K. Boshkayev, Jorge A. Rueda, and R. Ruffini, submitted to Astrophysical Journal Letters.
- **SGRs and AXPs as rotation powered massive white dwarfs**, M. Malheiro, Jorge A. Rueda, and R. Ruffini, submitted to Publications of the Astronomical Society of Japan.
- **A double component in GRB 090618: a proto-black hole and a genuine long GRB**, L. Izzo, R. Ruffini, A. V. Penacchioni, C. L. Bianco, L. Caito, S. K. Chakrabarti, Jorge A. Rueda, A. Nandi, and B. Patricelli1, submitted to Astronomy & Astrophysics.
- **On the critical mass of uniformly rotating white dwarfs in general relativity**, K. Boshkayev, Jorge A. Rueda, and R. Ruffini, International Journal of Modern Physics E, to appear.
- **Towards a relativistic Thomas-Fermi theory of white dwarfs and neutron stars**, Jorge A. Rueda and R. Ruffini, International Journal of Modern Physics E, to appear.
- **Mass, radius and moment of inertia of neutron stars**, R. Belvedere, Jorge A. Rueda and R. Ruffini, International Journal of Modern Physics E, to appear.
- **Cooling of young neutron stars in GRB associated to Supernova**, Rodrigo Negreiros, Remo Ruffini, Carlo Bianco and Jorge A. Rueda, Astronomy & Astrophysics; to appear.
- **The Klein first integrals in an equilibrium system with electromagnetic, weak, strong and gravitational interactions**, Jorge A. Rueda, R. Ruffini and S.-S. Xue, Nuclear Physics A; in press.
- **Relativistic Feynman-Metropolis-Teller theory for white dwarfs in general relativity**, M. Rotondo, Jorge A. Rueda, R. Ruffini and S.-S. Xue, Physical Review D 84, 084007 (2011).
- **The self-consistent general relativistic solution for a system of degenerate neutrons, protons and electrons in beta-equilibrium**, M. Rotondo, Jorge A. Rueda, R. Ruffini and S.-S. Xue, Physics Letters B 701, 667 (2011).
- **Relativistic Thomas-Fermi treatment of compressed atoms and compressed nuclear matter cores of stellar dimensions**, M. Rotondo, Jorge A. Rueda, R. Ruffini and S.-S. Xue, Physical Review C 83, 045805 (2011).
- **On Compressed Nuclear Matter: from Nuclei to Neutron Stars**, Jorge A. Rueda, M. Rotondo, R. Ruffini and S.-S. Xue, International Journal of Modern Physics D 20, 1789 (2011).

III b.Contributions to the Proceedings of Meetings and Workshops

- **On the minimum rotational period of fast rotating white dwarfs**, K. Boshkayev, Jorge A. Rueda, and R. Ruffini, Proceedings of Les Houches workshop "From Nuclei to White Dwarfs to Neutron Stars", Ed. A. Mezzacappa, World Scientific (2011).
- **On the relativistic Feynman-Metropolis-Teller equation of state and general relativistic white-dwarfs**, Jorge A. Rueda, M. Rotondo, R. Ruffini, and S.-S. Xue, Proceedings of Science, PoS(Texas2010), 269 (2011).
- **A general relativistic Thomas-Fermi treatment of neutron star cores**, D. Pugliese, Jorge A. Rueda, R. Ruffini, and S.-S. Xue, Proceedings of Science, PoS(Texas 2010), **271 (2011).**

Ruffini Remo

Position: Professor at Università "Sapienza" Roma
Director ICRANet
President IRAP Ph. D.

Curriculum Vitae:

- Doctorate in Physics, University of Rome, 1966.
- Postdoctoral fellow Mainz Academy of Sciences. Hamburg, Fed. Republic, Germany, 1967.
- Postdoctoral fellow Palmer Physics Lab. Princeton University, N.J., 1967-68.
- Member Institute for Advanced Study, Princeton, N.J., 1968-70.
- Instructor, Princeton Univ., 1970-71.
- Assistant Professor, Princeton University, 1971-74.
- Member Institute for Advanced Study, Princeton, N.J. 1974-76 .
- Visiting professor Kyoto University (Japan), 1975.
- Visiting professor University of Western Australia, Nedlands (Australia), 1975.
- Professor University of Catania, Italy, 1976-78.
- Professor, Chair of Theoretical Physics, University of Rome "la Sapienza", 1978-
- Member Council of Center. International Physics, Bogotà, Colombia, 1984-
- President International Center Relativistic Astrophysics (ICRA), 1985-
- Director of ICRANet, 2005-
- Member of Task Force Scientific Use of Space Station NASA, Washington, 1986-88.
- Chairman International Organizing Committee of Marcel Grossmann Meetings, 1984-
- Member International Forum on the Scientific Use of Space Station, Washington, 1986-90.
- Member of Consiglio Ricerche Astronomiche, Rome, 1987-91.
- Co-Chairman Italian-Korean Meetings on Relativistic Astrophysics, Rome and Seoul, 1987-
- Chairman William Fairbanks Meetings, 1990-
- President of the Scientific Committee of the Italian Space Agency, Rome, 1989-93.
- Member of the Board of ENEA, 2004-
- Co-Director Advanced Series in Astrophysics and Cosmology-World Scientific, Singapore, 1986
- Editor Internat. Jour. Modern Phys. D World Scientific Singapore, 1992-
- Editor of the series "The Marcel Grossmann meetings on relativistic Field Theories", 1985-
- Co- Editor of the Series" Italo-Korean meetings on Relativistic Astrophysics".
- Member Sigma Xi.
- Member Italian Physical Society.
- Founding Member of European Physical Society.
- Member of Euroscience
- Fellow recipient:
    - Cressy Morrison award of the New York Academy of Sciences , 1972.
    - Fellow of the American Physical Society 1974-
    - Alfred P. Sloan Foundation fellow, 1974-76.
    - Space Scientist of the Year Award, 1992.
    - Honorary Professor of University of Kirghizia 1998-

Main Scientific Publications:

Coauthor, among others, of the following books:

1. (with J. Bardeen, B. Carter, H. Gursky, S. Hawking, I. Novikov and K. Thorne) "Black holes", Ed. B. and C. de Witt, Gordon and Breach, New York, 1973,

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

Vereshchagin Gregory

Position: researcher
Period covered: 2011

I. Scientific Work

The work focused on mainly the following aspects:

- Electron-positron plasma in GRBs and in cosmology (with R. Ruffini)

Analogy and difference between electron-positron plasma in the early Universe and in sources of GRBs are discussed. We focus on a) dynamical differences, namely thermal acceleration of the outflow in GRB sources vs. cosmological deceleration; b) nuclear composition differences as synthesis of light elements in the early Universe and possible destruction of heavy elements in GRB plasma; c) different physical conditions during last scattering of photons by electrons in both cases leading to nearly perfect black body spectrum of the microwave background radiation vs. non thermal spectrum of the photospheric emission in GRBs.

- Evolution of the pair plasma generated by a strong electric field (with A. Benedetti, A.G. Aksenov and R. Ruffini)

Creation, acceleration and interactions of electron-positron pairs are studied numerically using the relativistic kinetic Boltzmann equation. We focus on long term evolution of the created uniformly distributed optically thick plasma, its thermalization and interaction with photons. Instead of spherical symmetry in the phase space traditionally used in kinetic theory, we adopt cylindrical symmetry, which appears to be more convenient in the problem under consideration.

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

Interactions in homogeneous electron-positron-photon plasma are studied numerically using the relativistic kinetic Boltzmann equation, with collisional integrals including Bose enhancement and Pauli blocking corrections. The new method of computing collisional integrals is developed.

- Photospheric emission from ultrarelativistic outflows (with I.A. Siutsou and R. Ruffini)

Emission from expanding spherically symmetric plasma becoming optically thin to Compton scattering is studied with particular attention to the relativistic effects. Observed flux and spectra are obtained assuming thermal distribution of photons in the comoving frame, and well defined last scattering surface of photons. These results find applications in the theory of Gamma Ray Bursts.

- Dynamics and emission from mildly relativistic plasma (with A.G. Aksenov and R. Ruffini)

Interactions and emission in a spherical region with optically thick relativistic plasma is studied using kinetic Boltzmann equations. High initial optical depth are considered, which results in radial self acceleration giving mildly relativistic velocities of expansion. Results of this work may be applied for future laboratory experiments aimed in creation of optically thick electron-positron pairs.

- Correlation dynamics in cosmology (with R. Ruffini and R. Zalaletdinov)

Two fundamental processes are known to occur in a self-gravitating system of collisionless massive particles: gravitational instability and violent relaxation. A new analytic approach is proposed aimed in describing these two apparently distinct phenomena as different manifestations of essentially the same physical process: gravitational structure formation. This approach is based on application of two averaging schemes: spatial averaging and coarse-graining. A master equation for spatially averaged coarse-grained distribution

function of dark matter is constructed and its limiting cases are analyzed. Discussion of the related works, such as the recent work of J. Einasto et al., (2011) discussing phase synchronization in the large scale structure is presented.

II. Conferences and educational activities

II a. Conferences and Other External Scientific Works

- GRBs, their progenitors and the role of thermal emission, Les Houches, France, 2-7 October, 2011
- From Nuclei to White Dwarfs and Neutron Stars, Les Houches, France, 3-8 April, 2011
- Recent News from the MeV, GeV and TeV Gamma-Ray Domains, Pescara, Italy, 21-26 March, 2011

II b. Work With Students

Barbara Patricelli, Luca Izzo

II c. Diploma thesis supervision

- Ivan Siutsou (IRAP PhD student, Belarus)
- Alberto Benedetti (Erasmus Mundus IRAP PhD student, Italy)
- Damien Begue` (Erasmus Mundus IRAP PhD student, France)

II d. Other Teaching Duties

- "Pair plasma in GRBs and cosmology", 2 lectures, IRAP Ph.D. Erasmus Mundus September school, Nice, 12 – 23 September, 2011

III. Service activities

III a. Within ICRANet

- Editing the proceedings of the 2nd Galileo-Xu Guangqi meeting held in Hanbury Botanic Gardens, Ventimiglia, Italy on July 12-18, 2010
- Editing the proceedings of the 12th Italian-Korean Symposium on Relativistic Astrophysics held in ICRANet, Pescara, Italy on July 4-8, 2011

III b. Outside ICRANet

- Referee for Europhysics Letters
- Supervision of the course work of undergraduate student of the Belorusian State University Ivan Rybak, title of the work "Analysis of equations for the two particle correlation function of dark matter as collisionless particles in the Newtonian approximation"
- Supervision of the course work of undergraduate student of the Belorusian State University Svetlana Vlasenko, title of the work "Cosmological limits on the mass of fermions as dark matter particles with negative chemical potential"

2011 List of Publications

- A. Benedetti, W.-B. Han, R. Ruffini, G.V. Vereshchagin, "On the frequency of oscillations in the pair plasma generated by a strong electric field", Physics Letters B, Vol. 698 (2011) 75-79.

- B. Patricelli, M.G. Bernardini, C.L. Bianco, L. Caito, L. Izzo, R. Ruffini and G.V. Vereshchagin, "A New Spectral Energy Distribution of Photons in the Fireshell Model of GRBs", International Journal of Modern Physics D, Vol. 20 (2011) 1983-1987.

- R. Ruffni, I. A. Siutsou and G. V. Vereshchagin, "Theory of photospheric emission from relativistic outflows", submitted to the Astrophysical Journal (2011).

Xue She-Sheng

Position: Staff
Period covered: 2010 – 2011

I. Scientific Work

The self-consistent general relativistic solution for a system of degenerate neutrons, protons and electrons in beta-equilibrium, Rotondo, Michael, Jorge A. Rueda, Remo Ruffini, and She-Sheng Xue.
Physics Letters B, Volume 701, Issue 5, p. 667-671 (2011).

The relativistic Feynman-Metropolis-Teller theory for white-dwarfs in general relativity, M. Rotondo, Jorge A. Rueda, Remo Ruffini, and She-Sheng Xue. To be published by Phys. Rev. D.

On the relativistic and electro-dynamical stability of massive nuclear density cores, V. S. Popov, M. Rotondo, R. Ruffini and S.-S. Xue, submitted to Phys. Rev. C, (2011); arXiv:astroph/0903.3727

On the relativistic Thomas-Fermi treatment of compressed atoms and compressed nuclear matter cores of stellar dimensions, M. Rotondo, Jorge A. Rueda, Remo Ruffini, and She-Sheng Xue,
Phys.Rev.C83:045805,2011

The Klein first integrals in an equilibrium system with electromagnetic, weak, strong and gravitational interactions, Jorge A. Rueda, Remo Ruffini, and She-Sheng Xue, To be published by Nuclear Physics A

On the equilibrium of self-gravitating neutrons, protons and electrons in β-equilibrium, M. Rotondo, Jorge A. Rueda, Remo Ruffini, and She-Sheng Xue. To be published by Phys. Rev. D.

Electron-positron pairs production in a macroscopic charged core
Remo Ruffini, and She-Sheng Xue , Phys. Lett. B 696 (2011) 416-412.

Electron-positron pairs in physics and astrophysics, from heavy nuclei to black holes
Remo Ruffini, Gregory Vereshchagin, She-She Xue , Phys. Rep. Vol 487 (2010) 1,

Electron-positron pair oscillation in spatially inhomogeneous electric field and radiation
Wen-Biao Han, Remo Ruffini, and She-Sheng Xue
Phys. Lett. B691 (2010) 99.

Detailed Discussions and Calculations of Quantum Regge Calculus of Einstein-Cartan theory
She-Sheng Xue , Phys. Rev. D82 (2010) 064039.

Neutrino oscillations in nuclear media
Iman Motie and She-Sheng Xue, submitted to journal of Physics G: Nuclear and Particle Physics.

Euler-Heisenberg Lagrangian and photon circular polarization
Iman Motie and She-Sheng Xue, to be published in Annals of Physics.

On the self-consistent equilibrium equations of neutron stars,
Jorge A. Rueda, Remo Ruffini, and She-Sheng Xue. Submitted to Phys. Rev Lett.

Electron and positron pair production in gravitational collapse
Wen-Biao Han, Remo Ruffini, and She-Sheng Xue, Submitted to Phys. Rev Lett..

Neutrinos and photons travel in a discrete space-time
She-Sheng Xue , to appear in Phys. Lett. B (2011).

II. Conferences and educational activities

Conferences and Other External Scientific Work
Presenting talks and posters in international ICRANet meetings:
3rd Galileo-Xu Guangqi meeting (Beijing, China)
2nd Galileo-Xu Guangqi meeting (Ventimiglia, Italy)
12th Italian-korean meeting (Pescara)
And international Conferences:
"TEXAS 2010, 25th Symposium on Relativistic Astrophysics", in Heidelberg (Germany), Dec. 6-10, 2010
Work With the research group of Gamma Ray Bursts and Neutron stars:
Carlo Luciano Bianco, Letizia Caito, G. Vereshchagin, B. Patricelli, G. De Barros, Juracy Luis, L.J. Rangel Lemos, and Jorge Rueda, M. Rotondo

Diploma thesis supervision
IRAP PhD. Faculty, thesis supervision and reading and examination
Han Wenbiao, Christine Gruber and Juracy Luis, L.J. Rangel Lemos, Yuanbin Wu
and Iranian students: Rohoollah Mohammadi, Iman Moti, and Ehsan Bavarsad

Other Teaching and working Duties
Teaching courses in Nice and Les Houches schools for IRAP Ph.D. Erasmus Mundus students
Discussion and Work With the Director R. Ruffini and External Professors
H. Kleinert, Pascal Chardonnet

III. Service activities
Within ICRANet
Participating organization of ICRANet meetings: the 12th Italian-Korean meeting (July, 2011, Pescara, Italy), 2nd Galileo - Xu Guangqi Meeting, July 12-18, 2010 Ventimiglia-Nice, Italy-France and 3rd Galileo-Xu Guangqi meeting (Oct. 11-16, 2011, Beijing, China)

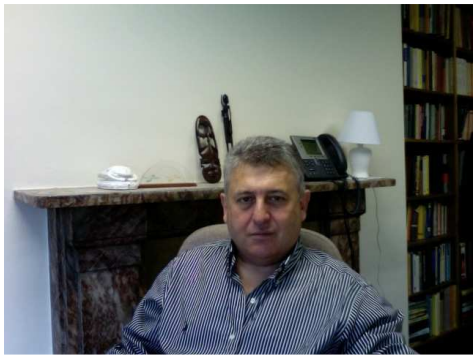
Editor of three conference proceedings: 5th Italian-Chinese meeting on Cosmology and Relativistic Astrophysics'', published by American Institute of Physics, 1st and 3rd Galileo –Xu Guangqi meeting, published by the International Journal of Modern Physics D, World scientific.

Participating organization of ICRANet Seminars

Give a public lecture in ICRANet Pescara center.

Outside ICRANet
External Professor of Chinese Academy and University
Controrelatore for thesis Diploma, Physics Department, University of Rome, La Sapienza.

Aharonian Felix A.



Positions: Professor of the Cosmic School of the Dublin
Institute for Advanced Studies (DIAS) and
Director of the Center for Astroparticle Physics
and Astrophysics at DIAS, Dublin, Ireland
and
Head of High Energy Astrophysics Theory Group,
MPI for Nuclear Physics, Heidelberg, Germany

Fields of Research: High Energy Astrophysics, Astroparticle Physics, Cosmology
Projects:

Involvement in major Projects:
Member (representative of ESA) of the Science Working Group of the JAXA-NASA X-ray mission ASTRO-H (X-ray Astronomy)
Member of the H.E.S.S. Collaboration Board (gamma-ray astronomy)
Member of the KM3NeT Consortium Board (neutrino astronomy)
Co-PI of the ROTSE network of optical telescopes (GRB afterglows)

Panels, Committees, Schools
Co-director of LEA - European Associated Laboratory on High Energy Astrophysics jointly supported by CNRS (France) and MPG (Germany)
Adjunct Professor, School of Physics, University College Dublin (USD)
Adjunct Professor and member of the International Center for Relativistic Astrophysics, Rome/Pescara, Italy
Scientific Advisor of the High Energy Astrophysics Laboratory, Yerevan, Armenia
Member ("Supervisor") of the Heidelberg Graduate School of Fundamental Physics,
Member of the International Review Board of the Helmholtz Association on Astroparticle Physics
Member of the European ASTRONET Infrastructure Roadmap Panel A:
"High energy astrophysics, astro-particle physics and gravitational waves"
Editor of the International Journal of Modern Physics D

PostDocs and Students:
DIAS/Dublin: two postdoctoral fellows and three PhD students
MPIK/Heidelberg: seven postdoctoral fellows and four PhD students
ICRANET/Pescara: one PhD student

Organization of International Workshops, Symposia, Schools (2011)
Dublin Summer School High On Energy Astrophysics, University College Dublin, Ireland,
July 4-15, 2011 (together with L. Hanlon)

The emerging, multi-wavelength view of the Galactic Centre Environment, Heidelberg,
Germany, October 17-20, 2011 (together with R. Crocker and D. Jones)

Multi-GeV Astrophysics with Ground-Based Detectors, Dublin Institute for Advanced Studies,
Ireland, December 12-14, 2011 (together with V. Bosch-Ramon)

Invited plenary talks:
Exploring the Very High Energy Sky with H.E.S.S, Rossi Prize talk at the American Astronomical
Society meeting, Jan 12, 2011, Seattle, USA

The Extreme Universe, invited lecture at the Inauguration of the Center for Astroparticle Physics `CAP Genève', March 9, 2011, Versoix, Switzerland

Predicting Galactic Neutrino Fluxes from Gamma Ray Data, XIV International Workshop on Neutrino Telescopes, March 15-18, 2011, Venice, Italy

High Energy Gamma Ray Astronomy, 3rd Roma International Conference on Astroparticle Physics, May 25-27, 2011, Rome, Italy

Probing Cosmic Ray Accelerators With Gamma Rays and Neutrinos, 32nd International Cosmic Ray Conference, August 11-18, 2011, Beijing, China

Gamma Rays: Physics Interpretation, 12th International Conference on Topics in Astroparticle and Underground Physics (TAUB 2011), September 5-9, 2011, Munich, Germany

Publications: more than 350 papers in peer review journals – more than 15,000 citations
see http://www.mpi-hd.mpg.de/astrophysik/HEA/1024.html)

2011 List of Publications (in peer-reviewed journals)

R.M. Crocker, F.A. Aharonian: Fermi Bubbles: *Giant, Multibillion-Year-Old Reservoirs of Galactic Center Cosmic Rays*, Phys.Rev Lett., 2011, vol. 106, id. 101102

A.M. Taylor, M. Ahlers, F.A. Aharonian: *The need for a local source of UHE CR nuclei,*Phys.Rev D, 2011, vol. 85, id. 105007 742, in. 98

V.N. Zirakashvili, F.A. Aharonian: *Radioactivity and electron acceleration in supernova remnants*, Phys.Rev D, 2011, vol. 84, id. 083010

S.R. Kelner, A. Yu. Prosekin, F.A. Aharonian: *Mechanics and kinetics in the Friedmann-Lemaître-Robertson-Walker space-times*, Phys.Rev D, 2011, vol. 84, id. 044016

I. Negueruela, M. Ribo, A. Herrero, J. Lorenzo, D. Khangulyan, F.A. Aharonian: *Astrophysical Parameters of LS 2883 and Implications for the PSR B1259-63 Gamma-ray Binary,* Astrophys. J Letters , 2011, vol. 732, id. L11

E. Lefa, F.A. Aharonian, F.M. Rieger: *"Leading blob" model in a stochastic acceleration scenario: the case of the 2009 flare of Mkn~501*, Astrophys. J Letters, 2011, vol. 743, id. L19 (2011)

D. Khangulyan, F.A. Aharonian, S. Bogovalov, M. Ribo: *Gamma Ray Signal from the Pulsar Wind in the Binary Pulsar system PSR B1259-63/LS2883*, Astrophys.J, 2011, vol. 742, id. 98

H. Odaka, F.A. Aharonian, S. Watanabe, Y. Tanaka, D. Khangulyan, T. Takahashi: *X-Ray Diagnostics of Giant Molecular Clouds in the Galactic Center Region and Past Activity of Sgr A**, Astrophys.J, 2011, vol. 740, id 103

E. Lefa, F.M. Rieger, F.A. Aharonian: *Formation of Very Hard Gamma-Ray Spectra of Blazars in Leptonic Models,* Astrophys. J, 2011, vol. 740, id. 64

O. Zacharopoulou, D. Khangulyan, F.A. Aharonian, L. Costamante: *Modeling the Hard TeV Spectra of Blazars 1ES 0229+200 and 3C 66A with an Interna Absorption Scenario,* Astrophys J, 2011, vol. 738, id. 157

X-Y. Wang, R.-Y. Liu, F.A. Aharonian: *Constraining the Emissivity of Ultrahigh Energy Cosmic Rays in the Distant Universe with the Diffuse Gamma-Ray Emission,* Astrophys.J, 2011, vol. 736, id 112

M. Chernyakova, D. Malyshev, F.A. Aharonian, R.M. Crocker, D.I. Jones: *The High-energy, Arcminute-scale Galactic Center Gamma-ray Source,* Astrophys.J, 2011, vol. 726, id 6

S. Bogovalov, D. Khangulyan, A.V. Koldoba, G.V. Ustyugova, F.A. Aharonian: *Modelling interaction of relativistic and non-relativistic winds in binary system PSR B1259-63/SS2883 - II. Impact of magnetization and anisotropy of the pulsar wind,* MNRAS, 2011, in press

R.M. Crocker, D.I. Jones, F.A. Aharonian, C.J. Law, F. Melia, T. Oka, J. Ott: *Wild at Heart: the particle astrophysics of the Galactic Centre,* MNRAS, 2011, vol. 413, 763-788

R.M. Crocker, D.I. Jones, F.A. Aharonian, C.J. Law, F. Melia, J. Ott: *Gamma-rays and the far-infrared-radio continuum correlation reveal a powerful Galactic Centre wind,* MNRAS, 2011, vol. 413, 763-788

A.Yu. Prosekin, S.R. Kelner, F.A. Aharonian: *Non-variable cosmologically distant gamma-ray emitters as an imprint of propagation of ultra-high- energy protons,* Astron. Astrophys. 2011, vol. 536, id.A30

G. Vannoni, F.A. Aharonian, S. Gabici, S.R. Kelner, A. Prosekin: *Acceleration and radiation of ultra-high energy protons in galaxy clusters*, Astron. Astrophys. 2011, vol. 536, id.A56

F. Vissani, F. Aharonian, N. Sahakyan: *On the detectability of high-energy galactic neutrino sources,* Astroparticle Physics, vol. 34, 778-783

Invited review papers:

F.A Aharonian: *Gamma-Ray Emission of Supernova Remnants and the Origin of Cosmic Rays,* Chapter in the book: Planets, Stars, and Stellar Systems, Springer Verlag, 2011

F.A. Aharonian, A. Bykov, E. Parizot, V. Ptuskin, A. Watson: *Cosmic Rays in Galactic and Extragalactic Magnetic Fields,* Space Science Reviews, 2011, in press

HESS collaboration papers:

9 papers in Astronomy and Astrophysics

1 paper in Astrophysical Journal

3 papers in Astroparticle Physics

1 paper in Phys. Rev. Letters

Amati Lorenzo

Position: ICRANet external collaborator
(researcher at INAF – IASF Bologna)

Short CV

Lorenzo Amati was born in Modena, Italy, in 1966. He graduated in Astronomy at the University of Bologna in 1991 and received the PhD degree in astronomy from University "La Sapienza" of Rome in 1999. Since 1998, Lorenzo Amati is a research staff member at the Institute of Space Astrophysics and Cosmic Physics (IASF) in Bologna, which is part of the Italian National Institute for Astrophysics (INAF). He is also Adjunct Professor of the Faculty of the International Center for Relativistic Astrophysics Network (ICRANet) and member of the Faculty of the PhD course in Physics at the University of Ferrara. In 2011 Lorenzo Amati was elected member of the Board for Relativistic and Particle Astrophysics of the Italian National Institute for Astrophysics (INAF).

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

I Scientific Work

My scientific collaboration with ICRANet is focused on Gamma-Ray Burst (GRB) astrophysics, with particular emphasis on the testing of the fireshell model against X-ray and gamma-ray data of the prompt emission. In particular, in 2011 we concentrated on the identification and interpretation of “disguised” short GRBs (e.g., GRB 050509B, De Barros et al., A&A, 2011), based also on their location and evolution in the Ep,i – Eiso plane, the evidence and explanation of thermal components in prompt emission spectra, the investigation within the fireshell model of GRBs showing a prompt emission characterized by a double component, the first of which dominated by thermal emission (e.g., GRB 101023, Penacchioni et al., submitted to A&A).

Besides my collaboration with ICRANet, my main scientific activity includes: spectral, timing and correlation properties of GRBs, investigation of the cosmological use of GRBs, X-ray spectral and timing properties of X-ray binaries, study of the scientific case and concept design of GRB detectors for future missions. Under this last respect, in particular, in 2011 I continued to collaborate with Prof. Braga (Director of INPE, Brazil) on the possibility of putting an Italian payload devoted to GRB studies on board the Brazilian space mission MIRAX, and I started coordinating the GRB Science Working Group of the LOFT mission (in the framework of the ESA/M3 assessment phase).

II Conferences and educational activities

Conferences and Other External Scientific Work

November 2011: “Swift and the Surprising Sky”, Milano, Italy (oral presentation)
October 2011: “LOFT Science Meeting”, Amsterdam, The Netherlands (oral presentation)
October 2011: “Third Galileo - Xu Guangqi meeting”, Beijing, China (invited oral presentation)

September 2011: "Second Ferrara Workshop on X-ray Astrophysics up to 511 keV" Ferrara, Italy (oral presentation)
July 2011: "Chemical Evolution of GRB Host Galaxies", Sexten - Sesto Pusteria (BZ), Italy (oral presentation)
July 2011: "12th Italian-Korean Symposium on Relativistic Astrophysics", Pescara, Italy (oral presentation)
May 2011: "Frascati Workshop 2011: Multifrequency Behaviour of High Energy Cosmic Sources", Vulcano (ME), Italy (invited oral presentation)
May 2011: "GRBs as probes", Como, Italy (oral presentation)

Work With Students
Discussions and joint data analysis of GRBs with some of the ICRANet IRAP Ph.D. students (e.g., collaborations with G. de Barros on the data analysis and interpretation of the "disguised short" GRB 050509B and with A. Penacchioni on data analysis and interpretation of the "double component" GRB 101023A).
Lecturer for the IRAP PhD at University of Ferrara, January – February 2006
Lecturer at the IRAP Ph.D. Erasmus Mundus Workshop, October 2011, Les Houches, France

III Service activities
Within ICRANet
- Member of the International Scientific Advisory Committee of the 3rd Galileo – Guangqui Workshop (Beijing, China)
- Member of Commissions for the Discussion of the Thesis of IRAP PhD: Students at Rome University "La Sapienza".

Outside ICRANet
- Reviewer of several articles for the main astrophysical journals (ApJ, A&A, MNRAS, PASJ)
- Member of the Editorial Board of "ISRN Astronomy & Astrophysics" (HINDAWI)
- Member of the Board for Relativistic and Particle Astrophysics of the Italian National Institute for Astrophysics (INAF)

2011 list of Publications
Refereed

M. Feroci, L. Stella, M. van der Klis, T. Corvousier, M. Hernanz, R. Hudec, A. Santangelo, D. Walton, A. Zdziarski, ..., M. Abramowicz, A. Alpar, D. Altamirano, J. M. Alvarez, L. Amati, et al., 2011, " The Large Observatory for X-ray Timing (LOFT) " , Experimental Astronomy, in press

A. Cucchiara, A.J. Levan, D.B. Fox, N.R. Tanvir, T.N. Ukwatta, E. Berger, T. Kruehler, A. Kupku Yoldas, X.F. Wu, K. Toma, J. Greiner, F. Olivares , A. Rowlinson, L. Amati, T. Sakamoto, K. Roth, A. Stephens, J.P.U. Fynbo, J. Hjorth, D. Malesani, P. Jakobsson, et al., 2011, " A photometric redshift of z~9.4 for GRB 090429B " , The Astrophysical Journal, 736, 7

L. Amati, M. Feroci, F. Frontera, C. Labanti, A. Vacchi, A. Argan, R. Campana, E. Costa, R. Ruffini, et al., 2011, " A proposed Italian contribution to the MIRAX Scientific payload " , Il Nuovo Cimento C, 34, 3

J.W. den Herder, L. Piro, T. Ohashi, C. Kouveliotou, D.H. Hartmann, J.S. Kaastra, L. Amati, M. Andersen, M. Arnaud, J.L. Atteia, et al., 2011, " ORIGIN: Metal Creation and Evolution from the Cosmic Dawn " , Experimental Astronomy, 23, 67

Y. Takei, E. Ursino, E. Branchini, T. Ohashi, H. Kawahara, K. Mitsuda, L. Piro, A. Corsi, L. Amati, J.W. den Herder, M. Galeazzi, J. Kaastra, L. Moscardini, F. Nicastro, F. Paerels, M. Roncarelli and M. Viel, 2011, " Studying the Warm-Hot Intergalactic Medium in Emission " , The Astrophysical Journal, 697, 328

A. Rossi, S. Schulze, S. Klose, D.A. Kann, A. Rau, H.A. Krimm, G. Johannesson, A. Panaitescu, F. Yuan, P. Ferrero, T. Krauhler, J. Greiner, P. Schady, S.B. Pandey, L. Amati, et al. 2011, " The Swift/ FermiGRB 080928 from 1 eV to 150 keV " , Astronomy & Astrophysics, 529, A142

G. De Barros, L. Amati, M.G. Bernardini, C.L. Bianco, L. Caito, L. Izzo, B. Patricelli, and R. Ruffini, 2011, " On the nature of GRB 050509b: a disguised short GRB. " , Astronomy & Astrophysics, 529, A130

C. Guidorzi, M. La Capra, F. Frontera, E. Montanari, L. Amati, F. Calura, L. Nicastro,, M. Orlandini, 2011, " Spectral catalogue of bright gamma-ray bursts detected with the BeppoSAX/GRBM " , Astronomy & Astrophysics, 526, A49

A. de Ugarte Postigo, I. Horvath, P. Veres, Z. Bagoly, D. A. Kann, C. C. Thoene, L. G. Balazs, P. D'Avanzo, M. A. Aloy, S. Foley, S. Campana, J. Mao, P. Jakobsson, S. Covino, J. P. U. Fynbo, J. Gorosabel, A. J. Castro-Tirado, L. Amati, M. Nardini, 2011, " Characteristics of Swift's intermediate-population bursts " , Astronomy & Astrophysics, 525, A109

Conference proceedings

P. Veres, A. de Ugarte Postigo, I. Horvath, Z. Bagoly, D.A. Kann, C.C. Thoene, L.G. Balazs, P. D'Avanzo, M.A. Aloy, S. Foley, S. Campana, J. Mao, P. Jakobsson, S. Covino, J.P.U. Fynbo, J. Gorosabel, A.J. Castro-Tirado, M. Nardini, L. Amati, 2011, " Properties of Swift`s intermediate bursts ", AIP Conference Proceedings, Volume 1358, p. 251

Arnett David

Present: Regents Professor, Steward Observatory, U. of Arizona

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

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

Professional Societies: AAS; APS (Fellow); IAU; AAAS (Fellow).

Fellowships and Awards:

Yale Distinguished Graduate Award, Physical Sciences (with J. W. Truran), 1980
A. von Humboldt Prize (Senior Scientist), 1981
Member, National Academy of Sciences (1985-)
Member, American Academy of Arts and Sciences (1985-)
Member, Aspen Center for Physics (1997-2007)
S. Chandrasekhar Lecturer, Bose Center for Physics, Kolkata, (2007)
S. Chandrasekhar Professor, ICRAnet, Rome, Pescara, Nice (2007-)
Bethe Prize, American Physical Society, 2009

Recent Professional Activities:

NRC Committee, Potential Impact of High-End Computing on Four Fields, 2008
DOE Joint Needs Panel on "High Energy Density Laboratory Plasmas", 2009
National Ignition Campaign Review Committee, LLNL, 2009-
Board, International Center for Relativistic Astrophysics Network (ICRAnet), 2009-

2011 List of Publications:

Evidence for Type Ia Supernova Diversity from Ultraviolet Observations with the Hubble Space Telescope
Wang, Xiaofeng; Wang, Lifan; Filippenko, Alexei V.; Aldering, Greg; Antilogus, Pierre; Arnett, David; Baade, Dietrich; Baron, Eddie; Barris, Brian J.; Benetti, Stefano; and 87 coauthors

Blast-Wave-Driven Instability Experiments Relevant To Supernova Hydrodynamics
Kuranz, Carolyn; Drake, R.; Grosskopf, M.; Budde, A.; Remington, B.; Robey, H.; Arnett, D.; Meakin, C.; Plewa, T.

Presupernova structure of massive stars
Meakin, Casey A.; Sukhbold, Tuguldur; Arnett, W. David

Chakrabarti Sandip Kumar

Position: Dean (Academic Programme), Head (Astrophysics and Cosmology) and Senior Professor, S.N. Bose National Centre for Basic Science, Kolkata
and
In Charge (Academic Affairs), Indian Centre for Space Physics, Kolkata
Period covered: 1.1.2011 – 31.12.2011
Recent period in which ICRA was visited: December, 2010; 26/5 – 3/6, 2011;

I Scientific Work

His main research work consists of study of the Astrophysical Flows around black holes. He studies the spectral and temporal properties of black holes, from quasars to nano-quasars. However he is also spending some time on formation and evolution of bio-molecules in star-forming region. He has published about 185 papers in International Refereed journal and a similar number of papers in Proceedings. He has written a book and edited several volumes.

II Conferences and educational activities

Doctorate Students Supervision

He has produced 16 Ph. D. scholars and another 8 students are registered for PhD. Four students are submiting their thesis soon. Six more students have joined since last year. One student from Nepal and another from Nigeria are presently working under his supervision. The students mainly worked on (a) Monte Carlo simulations of spectral and timing properties in presence of jets and outflows; (b) Outbursting black holes; (c) Quasi-periodic Oscillations of several black holes (d) Transonic accretion flows with heating and cooling; (e) Spectral properties of accretion disks having shock waves; (f) Formation of simple bio-molecules during star formation and Grain chemistry using Monte-Carlo simulations etc. (g) Ionospheric change in presence of terrestrial and extra-terrestrial high energy phenomena including seismic activities.

III Service activities

Talks/papers

November, 2010, Chaired the sessions and gave Invited talk on "VLF Campaigns in Summer, Winter and Solar
ecipses" at the International Workshop on Seismo-Electromagnetics and Atmospheric Science (IWSE-AS 2010), Agra
January, 2011, Invited talk on the Observational Evidence for Transonic Astrophysical Flows Around Black holes, at "Wideband X-ray astronomy" International Conference at IUCAA, Pune.
February, 2011: Invited talk on "Imaging in X-rays for space astronomy"
DST SERC School on Guided Wave Optics and Devices during February, 2011
February, 2011: Invited talk on Excitements in Astronomy and Space Physics at Students Reunion, St Xavier's College, Kolkata.
March 2011: Invited talk on "Astrochemistry in Relation to Origin of Life"
at the 41st ANNUAL RE-UNION of DEPARTMENT OF CHEMISTRY at Jadavpur University.
March 2011: ISRO RESPOND meeting lectures at Physical Research Laboratory.
May, 2011: 20th ESA conference on Balloons and Rockets in Heyres, France
May, 2011: Two lectures on astrophysical flows around black holes at EMJD programme.
August, 2011: "Perturbation of the GW signals from a binary system in presence of an accretion flow" at the Lijiang conference on Gravitation wave Astronomy
August, 2011: "Earthquakes and VLF signal anomalies" at the URSI conference in Istambul

September, 2011: "Excitements in Astrophysics" at the NCSM head quarters

2011 List of Publication

Papers in Journals:

S. Ray, S.K. Chakrabarti, S. Mondal, S. Sasmal, 2011, Correlation between night time VLF amplitude fluctuations and effective magnitudes of earthquakes in Indian sub-continent, Nat. Hazards and Earth Syst. Science. 11, 2699

P. S. Pal, S. K. Chakrabarti, A. Nandi, 2011, Evidence of variation of the accretion flow geometry in GRS 1915+105 from IXAE and RXTE data, IJMPD (In press)

S. Ray, S. K. Chakrabarti, S. Sasmal, 2011, Precursory Effects in the night time VLF signal Amplitude for the 18th Jan. 2011 Pakistan Earthquake, Ind. J. Physics, (in press).

S.K. Chakrabarti et al. 2011, VLF signals in summer and winter in the Indian sub-continent using multi-station campaigns, Ind. J. Physics, (In press).

I. Chattopadhyay and S. K. Chakrabarti, 2011, Effects of the composition on transonic properties of accretion flows around black holes, IJMPD (in press)

H. Ghosh, S. K. Garain, Kinsuk Giri, Sandip K. Chakrabarti, 2011, Effects of Compton Cooling on the Hydrodynamic and the Spectral Properties of a Two Component Accretion Flow around a Black Hole, MNRAS, 416, 959

A. Das, Sandip K. Chakrabarti, 2011, Composition and evolution of Interstellar Grain mantle under the effects of Photodissociation, MNRAS, 418, 545

C.B. Singh and S.K. Chakrabarti, 2011, Model dependence of outflow rates from an accretion disk in presence of a dissipative standing shock, IJMPD (in press).

C.B. Singh and Chajrabarti, S.K., 2011, Outflow rates in a black hole environment in presence of a dissipative standing shock, MNRAS, 410, 2414

K. Giri and Sandip Chakrabarti, 2011, Hydrodynamic simulations of viscous accretion flows around black holes, MNRAS (in press).

D. DEBNATH, A. NANDI, A. R. RAO, J. P. MALKAR, M. K. HINGAR, T. B. KOTOCH, S. SREEKUMAR, V. P. MADHAV,S. K. CHAKRABARTI, 2011, Instruments of RT-2 Experiment onboard CORONAS-PHOTON and their test and evaluation I: RT-2/S and RT-2/G Payloads, Exp. Astron. 29, 1

T. B. KOTOCH, A. NANDI, D. DEBNATH, J. P. MALKAR, A. R. RAO, M. K. HINGAR, V. P. MADHAV, S. SREEKUMAR, S. K. CHAKRABARTI, 2011, Instruments of RT-2 Experiment onboard CORONAS-PHOTON and their test and evaluation II: RT-2/CZT Payload, Exp. Astron. 29, 27

A. NANDI, S. PALIT, D. DEBNATH, S.K. CHAKRABARTI, T. B. KOTOCH, R. SARKAR, V. K. YADAV, V. GIRISH, A. R. RAO, D. BHATTACHARYA, 2011, Instruments of RT-2 Experiment onboard CORONAS-PHOTON and their test and evaluation III: Coded Aperture Mask and Fresnel Zone Plates in RT-2/CZT Payload, Exp. Astron. 9, 55

R. SARKAR, S. MANDAL, D. DEBNATH, T. B. KOTOCH, A. NANDI, A. R. RAO, S. K. CHAKRABARTI, 2011, Instruments of RT-2 Experiment onboard CORONAS-PHOTON and their test and evaluation IV: Background Simulations using GEANT-4 Toolkit, Exp. Astron. 29, 85

S. SREEKUMAR, P. VINOD, E. SAMUEL, J. P. MALKAR, A. R. RAO, M. K. HINGAR, V. P. MADHAV, D. DEBNATH, T. B. KOTOCH, A. NANDI, S. SHAHEDA BEGUM, S. K. Chakrabarti, 2011, Instruments of RT-2 Experiment onboard CORONAS-PHOTON and their test and evaluation V: Onboard software, Data Structure, Telemetry and Telecommand, Exp. Astron. 29, 109.

R. SARKAR & S.K. CHAKRABARTI, 2011, Feasibility of Spectro-Photometry in X-rays (SPHINX) from the Moon, Exp. Astron. 28, 61

Papers in Proceedings:
S. Pal, T. Basak and S. K. Chakrabarti, "Results of computing amplitude and phase of the VLF wave using wave hop theory", ADGEO, Vol-27, Solar Terrestrial, 2011.

S.K. Chakrabarti: “Transonic flows Around Black Holes” in the first Guangqi conference proceedings
Das, A., Chakrabarti, S. K., 2011, Composition of the grain mantle: A Monte Carlo Study: Proceedings of IAU Symposia, 280, 399

Chardonnet Pascal

Position: Full professor University of Savoie,
Adjunct Professor ICRANet,
European Coordinator EMJD
Period covered: 2010/2011

I Scientific Work

- Gamma-Ray Bursts : High Energy Emission, Dark Bursts, Progenitor
- Population III: Pair Instabilities Supernovae eEplosion
- Supernovae: Asymmetrical Explosion

II Conferences and educational activities

II a Conferences and Other External Scientific Work

- GRBs as probes: from the progenitor's environment to the high redshift Universe" May 16-20, 2011 - Como, Italy

II b Work With Students:

- Andrey Baranov (Erasmus Mundus Student)
- Anna Chiappinelli (ICRA Student)

II b. Work With Postdocs

Mikhail Popov Post-doc in LAPTH

III. Service activities

III a. Within ICRANet

- IRAP PhD Program
- Adjunct Professor

III b. Outside ICRANet

- Full Professor University of Savoie
- European coordinator EMJD
- Member of Laboratoire d'Annecy-le-Vieux de Physique Théorique
- Elected member of the Faculty of Science at University of Savoie

IV. Other

- French Ministry of Education: expert PES
- Agence Europe Education Formation France: consulting

2010 List of Publication

[1] *A. Baranov, P. Chardonnet, V.M. Chechetkin, A.A. Filina and M.V. Popov, "Extragalactic gamma-ray signal from* Asymmetric Supernova Nucleosynthesis with a Tracer Particles Method », *Accepted Astrophyscial Journal* .

[2] *A. Baranov, P. Chardonnet, V.M. Chechetkin, A.A. Filina and M.V. Popov, "Extragalactic gamma-ray signal from* Asymmetric Supernova Nucleosynthesis with a Tracer Particles Method *», published in Supernovae Explosion and Neutron Stars, Les Houches April 3-8 2011.*

[3] *A. Baranov, P. Chardonnet, V.M. Chechetkin, and M.V. Popov, "Pair-instability supernovae as possible explanation of GRBs» , published in Supernovae Explosion and Neutron Stars, Les Houches April 3-8 2011.*

[4] *A. Baranov, P. Chardonnet, V.M. Chechetkin, and M.V. Popov, "Pair-instability supernovae as possible explanation of GRBs», published in GRBs as Probes : from the progenitor's environment to the high redshift Universe May 16-20, 2011 –Como Italy.*

[5] *A. Baranov, P. Chardonnet, V.M. Chechetkin, and M.V. Popov, "Pair-instability supernovae as possible explanation of GRBs. Paper in preparation for Nature.*

[6] *A. Chiappinelli,, P.Chardonnet "The Galactic Center is alive". International Journal of Moden Physics D Vol 20. N 10 (2011)*

[7] *A.Chiappinelli,, P.Chardonnet "High energy emission in gamma-ray bursts", paper in preparation*

Chechetkin Valery

Position: Keldysh Institute of Applied Mathematics RAS
Main Scientific Researcher, Professor RAS;
1998-2011. M I PH U , Moscow, Russia , Professor
Period covered: Keldysh Institute of Applied Mathematics RAS
1994 –2011;
1998-2011. M I PH U , Moscow, Russia

I. Scientific Work

1. Chechetkin, V, Galanin, M. P.; Lukin, V. V. Mathematical modeling of relativistic magnetic jets, Conference Proceedings Vol. 103 "Frontier Objects in Astrophysics and Particle Physics" F. Giovannelli and G. Mannocchi (Eds.) SIF, Bologna, pp 373-388, 2011

2. Галанин М.П., Лукин В.В., Чечеткин В.М. Ускорение джетов при различныхвариантах моделирования источника вещества // Математическое моделирование.2011. Т. 23. № 10. С. 65-81

3. В.Г. Низьев, Ф.Х. Мирзаде, В.Я. Панченко, В.М. Чечеткин, Г.В. Устюгова "Численное моделирование процессов тепло-массопереноса при лазерном плавлении порошковой смеси", Математическое моделирование, 2011 Т. 23. №.8 . С.75-88

4. Мингалев И.В., Астафьева Н.М., Орлов К.Г., Мингалев В.С., Мингалев О.В., Чечеткин В.М., Возможность предсказания образования тропических циклонов и ураганов по данным спутниковых наблюдений // Современные проблемы дистанционного зондирования Земли из космоса, 2011. Т. 8. N 3. С. 290-296.

5. .Baranov, A. A.; Chechetkin, V. M. Did the SN 1987A outburst leave a compact remnant?, Astronomy Reports, Volume 55, Issue 6, pp.525-531

6. Vishnevskii, A. V.; Oparin, A. M.; Fimin, N. N.; Chechetkin, V. M, Numerical simulation of inviscid bubble dynamics in a centrally symmetric gravitational field, Computational Mathematics and Mathematical Physics, Volume 51, Issue 4, pp.637-649

7. Bondarev, A. E.; Galaktionov, V. A.; Chechetkin, V. M.Analysis of the development concepts and methods of visual data representation in computational physics Computational Mathematics and Mathematical Physics, Volume 51, Issue 4, pp.624-636

II. Conferences and educational activities

II a. Conferences and Other External Scientific Works

1.Chechetkin V.M. , Mechanism explosions for Supernovae, , From Nuclei to White Dwarfs and Neutron Stars, IRAP PH.D. ERASMUS MUNDUS WORKSHOP, April 3-8, 2011, , Les Houches ,France, I.C.R.A. Network – IRAP Ph.D ERASMUS MUNDUS WORKSHOP

2.BARANOV A.A AND CHECHETKIN V.M. Did the SN 1987A outburst leave a compact remnant?, From Nuclei to White Dwarfs and Neutron Stars, IRAP PH.D. ERASMUS MUNDUS WORKSHOP, April 3-8, 2011, Les Houches ,France, I.C.R.A. Network – IRAP Ph.D ERASMUS MUNDUS WORKSHOP

3. CHECHETKIN V.M., Dark matter, 11-th International Gamow Summer School "Astronomy and beyond: Astrophysics, Cosmology and Gravitation, Cosmomicrophysics, Radio-astronomy and Astrobiology", международная, (Ukraine, Odessa, Chernomorka, 22-28 August, 2011)

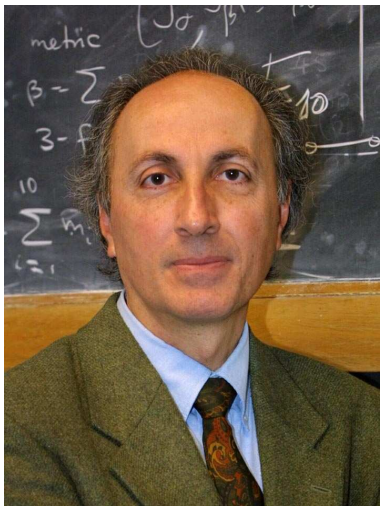
II b. Work With Students

1. Filina Anastasija, Explosive burning in stellar condition, M I PH U , Moscow, Russia
2. Blokhin Konstantin, Remnant of supernova arouud compact nreutron star, M I PH U , Moscow, Russia

II c. Diploma thesis supervision

Sychugov Konstantin, MRI in young stars.

Damour Thibault



Position: Professeur Permanent
Institut des Hautes Etudes Scientifiques.
Period covered: 2011

Conferences and educational activities
ICRANET-related Collaborations with
Alessandro NAGAR
Orchidea LECIAN

2011 List of publications (T. Damour, A. Nagar and O.M. Lecian)
1.
Energy versus Angular Momentum in Black Hole Binaries.
Thibault Damour, Alessandro Nagar, Denis Pollney, Christian Reisswig. Oct 2011. 4 pp.
e-Print: arXiv:1110.2938 [gr-qc]

Abstract:
Using accurate numerical relativity simulations of (nonspinning) black-hole binaries with mass ratios 1:1, 2:1 and 3:1 we compute the gauge invariant relation between the (reduced) binding energy E and the (reduced) angular momentum j of the system. We show that the relation $E(j)$ is an accurate diagnostic of the dynamics of a black-hole binary in a highly relativistic regime. By comparing the numerical-relativity $E^{\rm NR} (j)$ curve with the predictions of several analytic approximation schemes, we find that, while the usual, non-resummed post-Newtonian-expanded $E^{\rm PN} (j)$ relation exhibits large and growing deviations from $E^{\rm NR} (j)$, the prediction of the effective one-body formalism, based purely on known analytical results (without any calibration to numerical relativity), agrees strikingly well with the numerical-relativity results.

2.
Accurate numerical simulations of inspiralling binary neutron stars and their comparison with effective-one-body analytical models.
Luca Baiotti (Osaka U.), Thibault Damour (IHES, Bures-sur-Yvette & ICRA, Pescara), Bruno Giacomazzo (Maryland U. & NASA, Goddard), Alessandro Nagar (IHES, Bures-sur-Yvette), Luciano Rezzolla (Potsdam, Max Planck Inst. & Louisiana State U.). Mar 2011. 25 pp.
Published in Phys.Rev. D84 (2011) 024017
e-Print: arXiv:1103.3874 [gr-qc]

Abstract:
Binary neutron-star systems represent one of the most promising sources of gravitational waves. In order to be able to extract important information, notably about the equation of state of matter at nuclear density, it is necessary to have in hands an accurate analytical model of the expected waveforms. Following our recent work, we here analyze more in detail two general-relativistic simulations spanning about 20 gravitational-wave cycles of the inspiral of equal-mass binary neutron stars with different compactnesses, and compare them with a tidal extension of the effective-one-body (EOB) analytical model. The latter tidally extended EOB model is analytically complete up to the 1.5 post-Newtonian level, and contains an analytically undetermined parameter representing a higher-order amplification of tidal effects. We find that, by

calibrating this single parameter, the EOB model can reproduce, within the numerical error, the two numerical waveforms essentially up to the merger. By contrast, analytical models (either EOB, or Taylor-T4) that do not incorporate such a higher-order amplification of tidal effects, build a dephasing with respect to the numerical waveforms of several radians.

3.
Quantum Einstein-Dirac Bianchi Universes.
Thibault Damour (IHES, Bures-sur-Yvette), Philippe Spindel (UMH, Mons). Mar 2011. 50 pp.
Published in Phys.Rev. D83 (2011) 123520
e-Print: arXiv:1103.2927 [gr-qc]

Abstract:
We study the mini--superspace quantization of spatially homogeneous (Bianchi) cosmological universes sourced by a Dirac spinor field. The quantization of the homogeneous spinor leads to a finite-dimensional fermionic Hilbert space and thereby to a multi-component Wheeler-DeWitt equation whose main features are: (i) the presence of spin-dependent Morse-type potentials, and (ii) the appearance of a q-number squared-mass term, which is of order ${\cal O}(\hbar^2)$, and which is affected by ordering ambiguities. We give the exact quantum solution of the Bianchi type-II system (which contains both scattering states and bound states), and discuss the main qualitative features of the quantum dynamics of the (classically chaotic) Bianchi type-IX system. We compare the exact quantum dynamics of fermionic cosmological billiards to previous works that described the spinor field as being either classical or Grassmann-valued.

4.
About the Statistical Properties of Cosmological Billiards.
Thibault Damour, Orchidea Maria Lecian. Mar 2011. 10 pp.
e-Print: arXiv:1103.0179 [gr-qc]
Proceedings of The second Galileo-XuGuangqi Meeting, 11-16/07/2010, Ventimiglia, Italy

Abstract:
We summarize some recent progress in the understanding of the statistical properties of cosmological billiards.

5.
Statistical Properties of Cosmological Billiards.
Thibault Damour (IHES, Bures-sur-Yvette & ICRA, Pescara), Orchidea Maria Lecian (IHES, Bures-sur-Yvette & ICRA, Pescara & APC, Paris). Nov 2010. 51 pp.
Published in Phys.Rev. D83 (2011) 044038
e-Print: arXiv:1011.5797 [gr-qc]

Abstract:
Belinski, Khalatnikov and Lifshitz (BKL) pioneered the study of the statistical properties of the never-ending oscillatory behavior (among successive Kasner epochs) of the geometry near a space-like singularity. We show how the use of a "cosmological billiard" description allows one to refine and deepen the understanding of these statistical properties. Contrary to previous treatments, we do not quotient the dynamics by its discrete symmetry group (of order 6), thereby uncovering new phenomena, such as correlations between the successive billiard corners in which the oscillations take place. Starting from the general integral invariants of Hamiltonian systems, we show how to construct invariant measures for various projections of the cosmological-billiard dynamics. In particular, we exhibit, for the first time, a (non-normalizable) invariant measure on the "Kasner circle" which parametrizes the exponents of successive Kasner epochs. Finally, we discuss the relation between: (i) the unquotiented dynamics of the Bianchi IX (a, b, c or mixmaster) model; (ii) its quotienting by the group of permutations of (a, b, c); and (iii) the billiard dynamics that arose in recent studies suggesting the hidden presence of Kac-Moody symmetries in cosmological billiards.

6.
Accuracy and effectualness of closed-form, frequency-domain waveforms for non-spinning black hole binaries.
Thibault Damour (IHES, Bures-sur-Yvette & ICRA, Pescara), Alessandro Nagar (IHES, Bures-sur-Yvette), Miguel Trias (Balearic Islands U.). LIGO-P1000099-V3. Dec 2010. 32 pp.
Published in Phys.Rev. D83 (2011) 024006
e-Print: arXiv:1009.5998 [gr-qc]

Abstract:
The coalescences of binary black hole (BBH) systems, here taken to be non-spinning, are among the most promising sources for gravitational wave (GW) ground-based detectors, such as LIGO and Virgo. To detect the GW signals emitted by BBHs, and measure the parameters of the source, one needs to have in hand a bank of GW templates that are both effectual (for detection), and accurate (for measurement). We study the effectualness and the accuracy of the two types of parametrized banks of templates that are directly defined in the frequency-domain by means of closed-form expressions, namely 'post-Newtonian' (PN) and 'phenomenological' models. In absence of knowledge of the exact waveforms, our study assumes as fiducial, target waveforms the ones generated by the most accurate version of the effective one body (EOB) formalism. We find that, for initial GW detectors the use, at each point of parameter space, of the best closed-form template (among PN and phenomenological models) leads to an effectualness >97% over the entire mass range and >99% in an important fraction of parameter space; however, when considering advanced detectors, both of the closed-form frequency-domain models fail to be effectual enough in significant domains of the two-dimensional [total mass and mass ratio] parameter space. Moreover, we find that, both for initial and advanced detectors, the two closed-form frequency-domain models fail to satisfy the minimal required accuracy standard in a very large domain of the two-dimensional parameter space. In addition, a side result of our study is the determination, as a function of the mass ratio, of the maximum frequency at which a frequency-domain PN waveform can be 'joined' onto a NR-calibrated EOB waveform without undue loss of accuracy.

Della Valle Massimo

Position: Director
Osservatorio Astronomico di Capodimonte
Istituto Nazionale di Astrofisica-Napoli
Period covered: 1990-2010

I Scientific Work

The research activity spans several fields in the observational Astrophysics:

- Supernovae (local and at high redshifts) and measurement of the cosmological parameters; b) Gamma-ray bursts and their afterglows c) Supernova/GRB connection); d) Novae (galactic and extragalactic); e) Distance Scale.

Curriculum

1976. High School diploma, Brescia

1983. Laurea in Astronomia, Università di Padova (Summa cum Laude). Supervisor: Prof. L. Rosino.

1984. Fellow at the Asiago Astrophysical Observatory

1985. PhD student at the Byurakan Observatory (ex-URSS). Supervisor: Prof. Ambartsumian.

1988. PhD in Astronomy Università di Padova. Supervisors: Prof. L. Rosino, e M. Capaccioli

1989. Post-Doc at SISSA, Trieste

1990. Fellow at the European Southern Observatory, La Silla, Cile.

1994. Fellow at the European Southern Observatory, Munchen, Germany

1995. Assistant Professor at the Astronomy Dept., Universita' di Padova.

1999. Associate Astronomer at the Arcetri Astrophysical Observatory

2006. Adjunct Professor at the International Center for Relativistic Astrophysics Network, 65122, Pescara

2007. Director for Research at the Osservatorio Astronomico di Capodimonte, INAF-Napoli

2008. Associate Scientist at the ESO Telescope Division (on leave of INAF-Napoli)

2010. Director of the INAF-Capodimonte Astronomical Observatory

Sabbatical leaves (longer than 1 month)

1994, 1996, 1997, 1999, 2003, 2005. Visiting Scientist, European Southern Observatory, Garching.

1995, 1997, 2000, 2002, 2004. Visiting Scientist, Space Telescope, Science Institute, Baltimore.

1998, 2001, 2003. Visiting Scientist, European Southern Observatory, Santiago.

2006. Visiting Scientist, Department of Astronomy, Graduate School of Science, University of Tokyo, Japan

2006, 2007. Visiting Scientist, KAVLI Institute, Santa Barbara, California University

2007. Visiting Scientist, Dark Cosmology Center, Niels Bohr Institute, Copenhagen

2007. Visiting Scientist, Queen's University, Belfast, UK

2007. Visiting Scientist, Aspen Center for Physics, USA

Teaching
1989. Lecturer at the SISSA (Trieste): ``The Cosmological Distance Ladder'' .

1992. Visiting Professor, Centro de Astrofisica da Universidade do Porto, Portugal: ``The Late Stages of the Stellar Evolution'' (grad. level).

Assistant Professor for Esercitazioni di Astronomia I (Padova, Astronomy Dept. a.a.1993/94; 1994/95; 1995/96; 1996/97).

Assistant Professor for Laboratorio di Fisica II (Padova Astronomy Dept. a.a. 1995/96).

Assistant Professor for Astrofisica (Padova Astronomy Dept. a.a. 1996/97).

Professor in charge of Astronomia Generale (Padova Physics Dept. a.a. 1996/97; 1997/98)

Professor at the Physics Dept. Ferrara University for "Tecniche Osservative in Astronomia" (a.a. 2002/03; 2003/04; 2005/06; 2006/2007; 2007/2008).

Professor at the Physics Dept. Ferrara University for "Tecniche Osservative in Astronomia" and "Supernovae", PhD course (a.a. 2009/2010)
Lecturer in about fifteen national and international PhD Schools.

Publications:
Author of about 400 scientific papers, 156 referred articles, 137 GCN and IAU telegrams and 110 contributes to International Conferences.

Outreach
Author of about 40 popular papers published on Astronomia, Coelum, Le Stelle and national newspapers.

2011 List of Publications
1. The Afterglows of Swift-era Gamma-Ray Bursts. II. Type I GRB versus Type II GRB Optical Afterglows
Kann, D.A. et al. 2011, ApJ, 734,

2. Nearby supernova rates from the Lick Observatory Supernova Search - IV. A recovery method for the delay-time distribution
Maoz, D., Mannucci, F., Li, W., Filippenko, A.V., Della Valle, M., Panagia, N. 2011, MNRAS, 412, 1508

3. The Type IIP SN 2007od in UGC 12846: from a bright maximum to dust formation in the nebular phase
Inserra et al. 2011, MNRAS, 417, 261

4. No quantum gravity signature from the farthest quasars
Tamburini, F., Cuofano, C., Della Valle, M., Gilmozzi, R. 2011, A&A, 533, 71

5. Five supernova survey galaxies in the southern hemisphere. II. the supernova rates
Hakobyan, A. A. et al. 2011, Ap, 54, 301

6. X-ray monitoring of classical novae in the central region of M 31. II.
Autumn and winter 2007/2008 and 2008/2009 Henze, M. et al. 2011, A&A, 533, 52

7. Nova M31N 2007-12b: supersoft X-rays reveal an intermediate polar?
Pietsch, W., Henze, M., Haberl, F., Hernanz, M., Sala, G., Hartmann, D. H., Della Valle, M. 2011, A&A, 531, 22

8. Prospects for true calorimetry on Kerr black holes in core-collapse supernovae and mergers
Van Putten, M. H. P. M., Kanda, N., Tagoshi, H., Tatsumi, D. Masa-Katsu, F., Della Valle, M. 2011, PhRvD, 83, 4046

9. Supernovae and Gamma-Ray Bursts: A Decade of Observations
Della Valle, M. 2011, IJMPD, 20, 1745

10. The Fast and Faint SN 2010bh Associated with GRB 100316D
Bufano, F. et al. 2011, arXiv1111.4527B

11. Electromagnetic priors for black hole spindown in searches for gravitational waves from supernovae and long GRBs
Van Putten, M. H. P. M., Della Valle, M., Levinson, A. 2011, A&A, 535, 6

12. Evidence for Type Ia Supernova Diversity from Ultraviolet Observations with the Hubble Space Telescope
Wang, X. et al. 2011, arXiv1110.5809

13. Five Supernova Survey Galaxies in the Southern Hemisphere: Supernova Ia Rates
Hakobyan, A. A. et al. 2011, arXiv1107.3044

14. X-ray variability with WFXT . AGNs, transients and more, Paolillo, M. et al.
2011, MSAIS, 17, 97

15. T Pyxidis, Izzo et al. 2011, IAUC 9205

16. A minor body falling onto a neutron star as an explanation for the unusual gamma-ray burst GRB 101225A
Campana, S. et al. 2011, Nature, 480, 69

Fang Li-Zhi

Position: Adjunct Professor, Xu-Guangqi - ICRANet Chair
Period covered: 2011

I. Scientific Work

1. Statistical and dynamical decoupling of the IGM from dark matter, L.Z. Fang and Weshan Zhu, Advances in Astronomy, 2011, Article ID 492980, 9 pages
2. Dynamical effect of the turbulence of IGM on the baryon fraction distribution, W. S. Zhu, L. L. Feng and L.Z. Fang, Mon. Not. R. Astr. Soc., 415, 1093, 2011
3. Intermittence of the map of kinetic Sunyaev-Zel'dovich effect and turbulence of IGM, W. Zhu, L. L. Feng, and L. Z. Fang, Astrophys. J. Lett,, 734, 14, 2011
4. Effect of dust on Lyman-alpha photon transfer in optically thick halo. Y. Yang, I, Roy, C-W. Shu and L. Z. Fang, Astrophys. J., 739, 91, 2011
5. Time-dependent behavior of Lyman α photon transfer in high redshift optically thick medium, W. Xu, X.P. Wu, and L. Z. Fang, Mon. Not. R. Astr. Soc., in press, 2011

II. Conferences and educational activities

II a. Work With Students
Wenshan Zhu, Yi Lu, Ishani Roy, Yang Yang,

II b. Diploma thesis supervision
Ishani Roy's thesis: WENO Method in Computational Cosmology
Yang Yang's thesis: in progress

II c. Other Teaching Duties
Teaching Courses PHYS469/569 (general relativity) at the University of Arizona

II d. Work With Postdocs
Dr. Wen Xu, Dr. Jianmei Qiu

III. Service activities

III a. Within ICRANet
Chairperson of Steeling Committee of ICRAnet

III b. Outside ICRANet
Chair of Exam Committee of Department of Physics, University of Arizona

Frontera Filippo

Position: Full Professor University of Ferrara
Period covered: 2011

I Scientific Work

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

a. Gamma-ray lens development with long focal length (LAUE project);
b. Collaboration topics definition on HXMR with IHEP, Chinese Academy of Sciences, Beijing;
c. Observational studies of GRB prompt emission;
d. Observational studies of Compact objects in binary systems

II Conferences and educational activities

II a Conferences and Other External Scientific Work

a. EMJD IRAP-PhD school, Nice, May-June 2011
b. Organization of the Workshop On"X-ray Astrophysics up to 511 keV",, Ferrara, September 2011
c. Workshop on GRBs, Le Houches, October 2011
d. 3rd Galileo-XuGuangqi Meeting, October 2011

II b Work With Students

yes, with

a) 1 PhD student in Physics (Caterina Lombardi), University of Ferrara-IRAPP-PhD program
b) 2 PhD students (Vincenzo Liccardo, Vineeth Valsan), EMJD-IRAP-PhD program

II c Diploma thesis supervision

Yes, PhD Thesis by J. Rousselle, University of Toulouse

II d. Work With Postdocs

Yes, with two PostDocs E.Virgilli and R. Farinelli, at Physics Dept, University of Ferrara

III. Service activities

III a. Within ICRANet

Lectures to PhD students

III b. Outside ICRANet

Director of the PhD program in Physics, University of Ferrara

2010 List of Publication

Guidorzi, C.; Lacapra, M.; Frontera, F.; Montanari, E.; Amati, L.; Calura, F.; Nicastro, L.; Orlandini, M., *Spectral catalogue of bright gamma-ray bursts detected with the BeppoSAX/GRBM*, Astronomy and Astrophysics, Volume 526, id.A49 (2011)

Costa, Enrico; Frontera, Filippo, *Gamma Ray Burst origin and their afterglow: story of a discovery and more*, Rivista Nuovo Cimento, (2011)

Feroci, M.; Stella, L.; van der Klis, M.; Courvoisier, T. J.-L.; Hernanz, M.; Hudec, R.; Santangelo, A.; Walton, D.; Zdziarski, A.; Barret, D.; …, Frontera, F., and 192 coauthors, *The Large Observatory for X-ray Timing (LOFT)*, Experimental Astronomy, Online First (2011).

von Ballmoos, Peter; Alvarez, Jose; Barriere, Nicolas; Boggs, Steve; Bykov, Andrei; Del Cura Velayos, Juan Manuel; Frontera, Filippo; Hanlon, Lorraine; Hernanz, Margarita; Hinglais, Emmanuel; and 12 coauthors, *The DUAL mission concept*, in: UV, X-Ray, and Gamma-Ray Space Instrumentation for Astronomy XVII. Edited by Tsakalakos, Loucas. Proceedings of the SPIE, Volume 8145, pp. 81450E-81450E-15 (2011).

Virgilli, E.; Frontera, F.; Valsan, V.; Liccardo, V.; Carassiti, V.; Evangelisti, F.; Squerzanti, S, *Laue lenses for hard x-/soft γ-rays: new prototype results,* in: Optics for EUV, X-Ray, and Gamma-Ray Astronomy V. Edited by O'Dell, Stephen L.; Pareschi, Giovanni. Proceedings of the SPIE, Volume 8147, pp. 81471B-81471B-9 (2011).

Virgilli, E.; Frontera, F.; Valsan, V.; Liccardo, V.; Caroli, E.; Stephen, J. B.; Cassese, F.; Recanatesi, L.; Pecora, M.; Mottini, S.; and 2 coauthors, *The LAUE project for broadband gamma-ray focusing lenses,* in: Optics for EUV, X-Ray, and Gamma-Ray Astronomy V. Edited by O'Dell, Stephen L.; Pareschi, Giovanni. Proceedings of the SPIE, Volume 8147, pp. 81471C-81471C-7 (2011).

Lev Titarchuk, Ruben Farinelli, Lorenzo Amati, and Filippo Frontera, *Upscattering spectral formation model for the prompt emission of Gamma Ray Bursts*, ApJ submitted (2011)

R. Farinelli, L. Amati, F. Frontera, R. Landi, E. Palazzi, N. Shaposhnikov, L. Titarchuk, N. Masetti, M. Orlandini, and E. Montanari, *Spectral evolution of the X-ray nova XTE 1859+226 during its outburst observed by BeppoSAX and RXTE*, MNRAS submitted (2011)

Mauro Orlandini, Filippo Frontera, Nicola Masetti, Vito Sguera, Lara Sidoli, *BeppoSAX Observations of The X–Ray Pulsar MAXI J1409-619 in Low State: Discovery of Cyclotron Resonance Features*, ApJ submitted (2011)

Kleinert Hagen

Position: Richard Feynman Professor
Period covered: 2009

2011 List of Publications

A. Karamatskou and H. Kleinert Quantum Maupertuis Principle (quant-ph/0910.4034)

H. Kleinert Hubbard-Stratonovich Transformation: Successes, Failure, and Cure (cond-mat/1104.5161), EJTP 8, 57 (2011) (arXiv:1104.5161).

H. Kleinert Strong-Coupling Bose-Einstein Condensation (cond-mat/1105.5115)

H. Kleinert Extending Bogoliubov's Boson Theory to Strong Couplings preprint 2011

H. Kleinert Challenge to find Quasicrystals with Seven-Fold Symmetry preprint 2011

H. Kleinert The Purely Geometric Part of ``Dark Matter"—m A Fresh Playground for ``String Theory" (gr-qc/1107.2610)

H. Kleinert, Z. Narzikulov, A, Rakhimov, Quantum phase transitions in optical lattices beyond Bogoliubov approximation (cond-mat/1108.4695)

H. Kleinert and A. Chervyakov On Electron-Positron Pair Production by a Spatially Nonuniform Electric Field (hep-th/)

Madey John M. J.

Position: Professor of Physics and Astronomy
University of Hawai'i at Manoa
Period: 1 September 2010 - 30 September 2011

I Scientific Work:
relativistic beam-wave interactions, classical and quantum radiation theory

II. Conferences and educational activities
II a Conferences and Other External Scientific Work
4 October 2010: Public Lecture at ICRA in Pescara
5 October 2010 Review of FEL Physics and Technology at the Elletra Laboratory in Trieste

II b Work With Students
Academic Advisor to UH physics graduate students

II c Diploma thesis supervision
Thesis Advisor to Bryce Jacobson (degree awarded spring 2011)

II d Other Teaching Duties
Instructor, Advanced Electrodynamics

II e. Work With Postdocs
Postdoctoral Advisor, Bryce Jacobson

III. Service activities
III a. Within ICRANet
(see public presentations, above)

III b. Outside ICRANet
Reviewer, Optical Society of America, Journal of Quantum Electronics, Review of Scientific Instruments

IV. Other
Awarded R. R. Wilson Prize by the American Physical Society

2010 List of Publication
"Invention of the Free Electron Laser", in Reviews of Accelerator Sciente and Technology 3 (2010), page 1
Van deGraaf –based 13.5 nm Inverse Compton Light Source, invited paper for publication in the SPIE Journal of Micro/Nan Lithography, MEMS and MOEMS

Punsly Brian

Position: Research Scientist
Period covered: 1/2011-10/2011

1. Introduction

This report describes the research performed by Brian Punsly in cooperation with ICRANet in 2011. There were three lines of research. The first was directed at finding environmental factors that are related to the switch-on of the general relativistic engine responsible for a few percent of quasars driving powerful relativistic jets. This is important since this will related directly to constraints on the initial state and boundary conditions on numerical models of black hole driven jets. The second line of research was the study of 3-D numerical simulations of black hole magnetospheres and how they relate to observations of astrophysical jets. The third area of research is based on using the jet in the Galactic black hole GRS 1915+105 as a test case for black hole driven jets.

2. AGN Environments and the Launching of Jets

In 2011, the research was concentrated in two areas. Working with Shaohua Zhang, we mined the SDSS DR7 data base and FIRST database to study the relationship between accretion flow luminosity and jet power originally proposed by the classic paper of Rawlings and Sanders (1991). I am also leading collaborations to perform high frequency (high resolution), time resolved VLBA observations of broad absorption line quasars. Broad absorption line engines have weak or no central engine for powerful radio jets with the jets rarely strong enough to make it out of the host galaxy.

2a. Jet Power and Accretion Luminosity in AGN

The article, Punsly, Brian; Zhang, Shaohua, Calibrating Emission Lines as Quasar Bolometers was intended to see if line luminosity can be used to accurately estimate accretion flow luminosity**.**

2a.1 Abstract Calibrating Emission Lines as Quasar Bolometers:

Historically, emission lines have been considered a valuable tool for estimating the bolometric thermal luminosity of the accretion flow in AGN, L_{bol}. We study the reliability of this method by comparing line strengths to the optical/UV continuum luminosity of SDSS DR7 radio quiet quasars with $0.4<z<0.8$. We find formulae for L_{bol} as a function of single line strengths for the broad components of Hβ and Mg II, as well as the narrow lines of [OIII] and [O II]. We determine the standard errors of the formulae that are fitted to the data. Our new estimators are shown to be more accurate than archival line strength estimations in the literature. It is demonstrated that the broad lines are superior estimators of the continuum luminosity (and L_{bol}) with $H\beta$ being the most reliable. The fidelity of the each of the estimators is determined in the context of the SDSS DR7 radio loud quasars as an illustrative application of our results. In general, individual researchers can use our results as a tool to help decide if a particular line strength provides an adequate estimate of L_{bol} for their purposes. Finally, it is shown that considering all four line strength, simultaneously, can yield information on both L_{bol} and the radio jet power.

The article Punsly, Brian; Zhang, Shaohua, The Jet Power and Emission-line Correlations of Radio-loud Optically Selected Quasars was intended to see if Rawlings and Sanders (1991) were right and use optically selected deep samples to see how strong most quasar jets really are.

2a.2 Abstract The Jet Power and Emission-line Correlations of Radio-loud Optically Selected Quasars:

In this Letter, the properties of the extended radio emission form SDSS DR7 quasars with $0.4<z<0.8$ is studied. This low redshift sample is useful since any corresponding FIRST radio observations are sensitive enough to detect extended flux in even the weakest FR II radio sources. In the sample, 2.7\% of the sources have detectable extended emission on larger than galactic scales ($>$ 20 - 30 kpc). The frequency of quasars with FR II level extended radio emission is $\approx 2.3\%$ and $>0.4\%$ of quasars have FR I level extended radio emission. The lower limit simply reflects the flux density limit of the survey. The distribution of the long term time averaged jet powers of these quasars, $\overline{Q}$, has a broad peak $\sim 3\times 10^{44}$ ergs/sec that turns over below 10^{44} ergs/sec and sources above 10^{45} ergs/sec are extremely rare. It is found that the correlation between the bolometric (total thermal) luminosity of the accretion flow, L_{bol}, and $\overline{Q}$ is not strong. The correlation of $\overline{Q}$ with narrow line luminosity is stronger than the correlation with broad line luminosity and the continuum luminosity. It is therefore concluded that previous interpretations of correlations of $\overline{Q}$ with narrow line strengths in radio galaxies as a direct correlation of jet power and accretion power have been overstated. It is explained why this interpretation mistakenly overlooks the sizeable fraction of sources with weak accretion luminosity and powerful jets discovered by Ogle et al (2006).

2b. VLBA Observations of Sub-Parsec Structure in Mrk 231: Interaction between a Relativistic Jet and a BAL Wind
I am leading an effort to study Mrk 231 at the highest resolution. It is the nearest broad absorption line quasar and we have proven that it conforms with the idea of a polar broad absorption line outflow (instead of the popular notion of an equatorial outflow) that was developed in Punsly (1999a,b). This research and proposal is being done in collaboration with Cormac Reynolds (Curtin University of Technology, Department of Imaging and Applied Physics), Christopher P. O'Dea (Department of Physics, Rochester Institute of Technology) and Joan Wrobel (NRAO, Socorro).

2b.1. Large VLBA Proposal Approved
We have already received re-approval for 2011 for a very aggressive observation this object.
Abstract
We propose VLBA monitoring at 8.4, 15, 22 and 43 GHz of a high frequency flare in the nearby quasar MRK231. The "target of opportunity" observation (ToO) would be triggered by a flare detected by VLA monitoring at 22 and 43 GHz (see related proposal). The primary goals would be to detect a superluminal motion, estimate the internal energy of the flare from the spectrum and component sizes, and monitor the temporal evolution in order to understand the energy injection mechanism (rise) and the cooling mechanism (decay).
Background
From previous VLBA studies of MRK231 in Reynolds et al (2009) and other RQ (radio quiet) quasar studies, we have seen that RQ AGN can have relativistic outflows with significant kinetic luminosities (but maybe for short periods of time). So this raises the question what is it that makes some sources RQ and others radio loud (RL)? At a redshift of 0.042, MRK231 is one of the nearest radio quiet quasars to earth. The radio core is perhaps the brightest of any radio quiet quasar at high frequency (22 and 43 GHz). The combination of significant 43 GHz flux density and its proximity to earth makes MRK231 the optimal radio quiet quasar for study with VLBA. No other radio quiet quasar central engine can be explored with such high resolution, so it is ideal for studying the high kinetic luminosity relativistic ejecta in radio quiet quasars. 43 GHz VLBA observations can fully resolve nuclear structure to within 3.5 x 10^{17} cm. We propose to use sensitive high resolution observations to study the temporal evolution of the size and spectrum of a strong flare in MRK231 in order to shed light on why such strong flares cool off and never link to large scale powerful radio lobes.

2b2. VLBA Observations of Parsec Scale Structure of the "Radio Loud" BALQSO FIRST J1556+3517
I am also leading an effort to study FIRST J1556+3517at the high resolution. It is one of the nearest broad absorption line quasar and we have proven (Ghosh and Punsly 2007) that it conforms with the idea of a polar broad absorption line outflow (instead of the popular notion of an equatorial outflow) that was

developed in Punsly (1999a,b). The first epoch observations are complete the second epoch observations are stil in the proposal review cycle..This proposal was done in collaboration with Cormac Reynolds (Curtin University of Technology, Department of Imaging and Applied Physics), and Christopher P. O'Dea (Department of Physics, Rochester Institute of Technology).
ABSTRACT FROM ACCEPTED PROPOSAL: We propose VLBA observations at 1.8, 5, 8.4 and 15 GHz of the Broad Absorption Line Quasar FIRST J1556+3517 ("the first radio loud BALQSO"). The primary goal would be to resolve the flat spectrum radio core for the first time. Determination of the radio jet direction, in consort with the knowledge that the jet is relativistic and viewed in a pole-on orientation and the known PA of the optical continuum polarization tightly restrict the quasar geometry. This will allow us to directly constrain the relative orientations of the "dusty torus" (scattering surface), accretion disk and the broad absorption line outflow. We also propose multiple frequency observations to look for free-free absorption that might arise from the local environment of the accretion disk or the BAL wind gas itself. If the jet is resolved by the VLBA, this observation would be the first data point in a search for component motion. If the jet is not resolved, the incredibly compact nature of the relativistic outflow indicates a severe kinematical environment.

3. 3-D Numerical Simulations of Black Hole Magnetospheres

There were two efforts in this regard. The first showed that simulations of Blandford-Znajek jets were not efficient enough to drive powerful AGN. This initiated a flurry of activity by the Blandford-Znajek school to rerun simulations with new boundary conditions and initial states to drive up the power. The grandiose claims of needed to evolve the system from a physically plausible initial state needed to be dropped in light of this emergency. The second showed how the results (whether there is an ergospheric disk jet or Blandford-Znajek jet) of all simulations depend on numerical artifacts derived from numerical diffusion induced reconnection.

3a.1. Numerical Simulations and Large Jet Powers.

Abstract from Punsly, B., High Jet Efficiency and Simulations of Black Hole Magnetospheres:
This article reports on a growing body of observational evidence that many powerful lobe dominated (FR II) radio sources likely have jets with high efficiency. This study extends the maximum efficiency line (jet power $\approx$ 25 times the thermal luminosity) defined in Fernandes et (2010) so as to span four decades of jet power. The fact that this line extends over the full span of FR II radio power is a strong indication that this is a fundamental property of jet production that is independent of accretion power. This is a valuable constraint for theorists. For example, the currently popular "no net flux" numerical models of black hole accretion produce jets that are 2 to 3 orders of magnitude too weak to be consistent with sources near maximum efficiency.

3b.1. Numerical Simulations and Reconnection

.Abstract from Punsly, B. Evidence on the Origin of Ergospheric Disk Field Line Topology in Simulations of Black Hole Accretion:
This Letter investigates the origin of the asymmetric magnetic field line geometry in the ergospheric disk (and the corresponding asymmetric powerful jet) in 3-D perfect magnetohydrodynamic (MHD) numerical simulations of a rapidly rotating black hole accretion system reported in \citet{pun10}. Understanding, why and how these unexpected asymmetric structures form is of practical interest because an ergospheric disk jet can boost the black hole driven jet power many-fold possibly resolving a fundamental disconnect between the energy flux estimates of powerful quasar jets and simulated jet power \citep{pun11}. The new 3-D simulations of \citet{bec09} that were run with basically the same code that was used in the simulation discussed in \citet{pun10} describe the "coronal mechanism" of accreting poliodal magnetic flux towards the event horizon. It was determined that reconnection in the inner accretion disk is a "necessary" component for this process. The coronal mechanism seems to naturally explain the asymmetric ergospheric disk field lines that were seen in the simulations. Using examples from the literature, it is discussed how apparently small changes in the reconnection geometry and rates can make enormous changes in the magnetospheric flux distribution and the resultant black hole driven jet power in a numerical simulation. Unfortunately,

reconnection is a consequence of numerical diffusion and not a detailed (yet to be fully understood) physical mechanism in the existing suite of perfect MHD based numerical simulations. The implication is that there is presently great uncertainty in the flux distribution of astrophysical black hole magnetospheres and the resultant jet power.

4. GRS 1915+105 as a Laboratory for Studying Black Hole Driven Jets

I am currently embarked on a research program to study the Galactic black hole jet in GRS 1915+105. There is much confusion in this field because it is led by scientist not familiar with the history of astrophysical jets or the theory of black holes. There are three large projects that were developed in 2011 and I glad to report that one is in production.

Abstract from Punsly, B. Models of the compact jet in GRS 1915+105;

In this article, models are constructed of the compact jet in GRS 1915+105 during an epoch of optimal data capture. On April 02, 2003, the object was observed in the hard X-ray/soft gamma ray band (INTEGRAL), hard X-ray band (RXTE), near IR (ESO/New Technology

Telescope) and the VLBA (8.3 GHz and 15 GHz). The source was in a so-called "high plateau state." The large radio flux provides high signal to noise ratios in the radio images. Thus, one can image the jet out to large distances ($ > 10^{15}$ cm). This combined with the broadband coverage make this epoch the best suited for modeling the jet. The parametric method developed in the papers \cite{ghi85,ghi89,ghi96,sam97} that has been successfully utilized in the realm of extragalactic radio jets is implemented. The basic model is one where external inverse Compton (EIC) scattering of accretion disk photons by jet plasma provides the hard X-ray powerlaw. Unlike AGN jets, it is found that the radio jet must be highly stratified in the transverse direction in order to produce the observed surface brightness distribution in the radio images. Various jet models are considered. The jet power is $Q \approx 3-4 \times 10^{38}$ ergs/sec if the hard X-ray powerlaw luminosity is from EIC in the jet and $Q \approx 2 - 9 \times 10^{37}$ ergs/sec if the X-rays are emitted from the accretion disk corona. These estimates indicate that the jet power can be as high as 60\% of the total X-ray luminosity.

2011 List of Publication

Punsly, B. High Jet Efficiency and Simulations of Black Hole Magnetospheres, The Astrophysical Journal Letters, Volume 728, L17 (2011).

Punsly, Brian; Zhang, Shaohua Calibrating emission lines as quasar bolometers, Monthly Notices of the Royal Astronomical Society: Letters, Volume 412, pp. L123-L127

Punsly, Brian; Zhang, Shaohua The Jet Power and Emission-line Correlations of Radio-loud Optically Selected Quasars, The Astrophysical Journal Letters, Volume 735, L3 (2011).

Punsly, B. Models of the compact jet in GRS 1915+105 MNRAS in press

Punsly, B. Evidence on the Origin of Ergospheric Disk Field Line Topology in Simulations of Black Hole Accretion MNRAS Letters in press

Quevedo Hernando

Position: Full Profesor
(Universidad Nacional Autónoma de México)
Adjunct Professor (ICRANet)
Period covered: December 2010 – November 2011

I. Scientific Work

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

II. Conferences and educational activities

II a. Conferences and Other External Scientific Works
International Conference on Symmetries in Physics (Zacatecas, México, February, 2011)

9th International Workshop on Applied Category Theory Graph-Logic (San Antonio, Texas, USA, March, 2011)

II b. Work With Students
ICRANet students:
- Kuantay Boshkayev
  Topic: Exact and approximate metrics in relativistic astrophysics
-

II c. Diploma thesis supervision
ICRANet students:
- Orlando Luongo (PhD)
  Topics: Geometrothermodynamics in general relativity and cosmology
- Daniela Pugliese (PhD)
  Topic: Motion of test particles around naked singularities
- Safia Taj (PhD)
  Topic: Applications of geometrothermodynamics in non-standard theories of gravity
- Alessandro Bravetti (PhD)
  Topic: Topological and geometric properties of the thermodynamic phase space

UNAM students:
- Lorena Campuzano (MSc)
  Topic: Geometrothermodynamics of cosmological models
- Francisco Hernandez (PhD)
  Topic: Holography in field theories
- Francisco Nettel (PhD)
  Topic: Topological quantization in string theory
- Antonio Ramirez (BSc)
  Topic: Geometrothermodynamics of the van der Waals gas
- Moices Rodriguez (PhD)

Topic: Topological quantum mechanics
- Alejandro Vazquez (PhD)
  Topic: Variational principles in geometrothermodynamics

II d. Other Teaching Duties

- Advanced topics in modern cosmology (advanced course for PhD students -UNAM)

II e. Work With Postdocs

- Dr. Alberto Sanchez (UNAM)
  Topic: Geometrothermodynamics and statistics of black holes
- Dr. Cesar Lopez (UNAM)
  Topic: Relativistic and non-equilibrium thermodynamics

2011 List of Publications

- "Exterior and Interior Metrics with Quadrupole Moment" (H. Quevedo), *General Relativity and Gravitation,* 43:1141-1152 (2011).

- "Phase Transitions in Geometrothermodynamics" (H. Quevedo, A. Sánchez, S. Taj and A. Vázquez), *General Relativity and Gravitation,* 43:1153-1165 (2011).

- "Mass Quadrupole as a Source of Naked Singularities" (H. Quevedo), *International Journal of Modern Physics D,* 20, 1779-1787 (2011).

- "Topological Spectrum of the Harmonic Oscillator" (F. Nettel and H. Quevedo), *International Journal of Pure and Applied Mathematics*, 70, 117-123 (2011).

- "Circular Motion of Neutral Test Particles in Reissner-Nordström spacetime" (D. Pugliese, H. Quevedo and R. Ruffini), *Physical Review D* 83:024021 (2011).

- "Thermodynamic Geometry of Charged Rotating BTZ Black Holes" (M. Akbar, H. Quevedo, K. Saifullah, A. Sanchez, S. Taj) *Physical Review D* 83:084031 (2011).

- "Motion of charged test particles in Reissner-Nordström spacetime" (D. Pugliese, H. Quevedo, R. Ruffini), *Physical Review D*, *Physical Review D*, 83:104042 (2011).

- "Equatorial circular motion in Kerr spacetime" (D. Pugliese, H. Quevedo, R. Ruffini), *Physical Review D*, 84:044030 (2011).

- "Fundamentals of Geometrothermodynamics" (H. Quevedo and M. N. Quevedo), *Electronic Journal of Theoretical Physics*, (2011) accepted.
- "Statistical Thermodynamics of Economic Systems" (H. Quevedo and M. N. Quevedo), *Journal of Thermodynamics*, (2011) accepted.

- "The Expansion of the Universe without a Cosmological Constant" (O. Luongo and H. Quevedo), *Astrophysics and Space Science*, (2011) accepted.

- "Holographic dark matter and dark energy with second order invariants", (A. Aviles, L. Bonanno, O. Luongo, H. Quevedo) *Physical Review D*, (2011) accepted.

- "Geometrothermodynamics in Horava-Lifshitz Gravity" (H. Quevedo, A. Sánchez, S. Taj, A. Vazquez), *Journal of Physics A*, (2011) accepted.

- "Multipolar Solutions" (H. Quevedo) in Proceedings of the XIV Brazilian School of Cosmology and Gravitation (Mangaratiba-Río de Janeiro, Brazil, August-September, 2010).

-"Topological Quantization of Free Massive Bosonic Fields" (G. Arciniega, F. Nettel, L. Patiño and H. Quevedo) Proceedings of the Thirteenth International Conference on Geometry, Integrability and Quantization (Varna, Bulgaria, junio, 2011)

Rosati Piero

Position: Full Astronomer at the European
http://ww.eso.org/~prosati

I Scientific Work

Most of my scientific activity this year focused on the CLASH project: Cluster Lensing and Supernova survey with Hubble, as PI of the ESO Large Programme:
Dark Matter Mass Distributions of Hubble Treasury Clusters and the Foundations of ΛCDM Structure Formation Models". The first science results from this programme started to appear in 2011 (see publications below). Other scientific work was devoted to a) the discovery and study of distant galaxy clusters, and their implication for Cosmology; b) the development of the Wide Field X-ray Telescope mission (see http://www.wfxt.eu).

II Conferences and educational activities

II a Conferences and Other External Scientific Work

- "Testing the ΛCDM Paradigm with the Mass Distribution of Massive Clusters out to z = 1.4" Invited Talk presented at "Astrophysics and Cosmology with Galaxy Clusters", KITP, Santa Barbara, Mar 14-18, 2011
- "Testing the ΛCDM Paradigm with the Mass Distribution and Abundance of Massive Clusters out to z = 1.4", Heidelberg Colloquium presented at University of Heidelberg, Apr 26, 2011
- "Gravitational Lensing as a Tool to Probe the First Generation of Stars", Invited Talk presented at "Galaxies, Near and Far: conference in honor of Bob Fosbury", Villa Aureli, PG (Italy), May 23-25, 2011
- Invited Review on "Cluster Surveys and Evolution", presented at "Very Wide Field Surveys in the Light of Astro2010", STScI, Baltimore, June 13-16, 2011
- "Testing the ΛCDM Scenario and the Nature of the Dark Matter with the Mass Distribution of Massive X-ray Clusters"
- Invited Talk presented at "Second Ferrara Workshop on X-ray Astrophysics up to 511 keV", Ferrara, (Italy), Sept 14-16, 2011
- Status and first results from the ESO-CLASH Large Programme"

Talk presented at the "Second CLASH Team meeting" in Heidelberg (Germany), Oct 17-19, 2011

II b Work With Students

- Carolina Nunez (ESO/IMPRS) "Galaxy populations in distant clusters" (end Aug 2011)
- Barbara Sartoris (ESO/Triest) "Study of structures formation and evolution in non-standard cosmological models" (end Dec 2011)
- Alex Böhnert (ESO/Bonn) "Strong Lensing inversion techniques"

II c Other Teaching Duties

- Student board committees at ESO
- Lecture at University of Ferrara on X-ray Clusters as a Probe of Cosmology, Structure Formation, Primordial Galaxies and and Dark Matter on 28 Jun 2011

III. Service activities

III a. Within ICRANet: N/A this year

III b. Outside ICRANet:

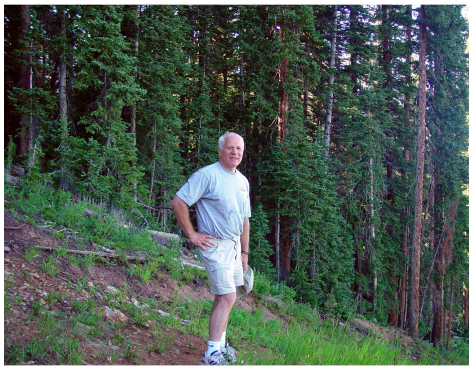
- Telescope Allocation Committee for NASA/Chandra (Boston, Jun 21-23 2011) and ESA/Herschel (ESAC, Spain, Nov 7-10) missions
- Member of the ELT Science Working Group
- Junior PI in Cluster of Excellence ``Origin and Structure of the Universe'' (Garching) - Research Area E
- European Lead and deputy PI of the Wide Field X-ray Telescope mission (new NASA/RFI proposal submitted in Oct 2011)

2010 List of Publication

1. J.S. Santos, P.Tozzi, P.Rosati, M.Nonino, G.Giovannini 2001
Deep Chandra observation of the galaxy cluster WARPJ1415.1+3612 at z=1: an evolved cool-core cluster at high-redshift, A&A, submitted
2. Sartoris, B., Borgani, S., Rosati, P. & Weller, J. 2011
Probing dark energy with the next generation X-ray surveys of galaxy clusters,
MNRAS, submitted
3. Talia, M. et al. (16 coauthors including P. Rosati) 2011
GMASS ultra-deep spectroscopy of galaxies at z ~ 2 - VII. Star formation, extinction, and gas outflows from UV spectra, A&A, in press (arXiv:1111.4402)
4. Zitrin, A.; Rosati, P.; Nonino, M.; Grillo, C.; Postman, M. et al. 2011
CLASH: New Multiple-Images Constraining the Inner Mass Profile of MACS J1206.2−0847, ApJL, submitted (arXiv:1007.2649)
5. Postman, M. et al. (43 coauthors including P. Rosati) 2011
Cluster Lensing And Supernova survey with Hubble (CLASH): An Overview ,
ApJ, submitted (arXiv:1006.3328)
6. Suzuki, N. et al. (65 coauthors including P. Rosati) 2011
The Hubble Space Telescope Cluster Supernova Survey: V. Improving the Dark Energy Constraints Above z>1 and Building an Early-Type-Hosted Supernova Sample,
Ap.J. in press (arXiv:1105.3470)
7. Koekemoer, A.M. et al. (123 coauthors including P. Rosati) 2011
CANDELS: The Cosmic Assembly Near-infrared Deep Extragalactic Legacy Survey - The Hubble Space Telescope Observations, Imaging Data Products and Mosaics,
ApJS, submitted (arXiv:1105.3754)
8. Grogin, N.A. et al. (107 coauthors including P. Rosati) 2011
CANDELS: The Cosmic Assembly Near-infrared Deep Extragalactic Legacy Survey,
ApJS, (arXiv:1105.3753)
9. Zitrin, A. et al. (41 coauthors including P. Rosati) 2011
The Cluster Lensing and Supernova Survey with Hubble (CLASH): Strong Lensing Analysis of Abell 383 from 16-Band HST WFC3/ACS Imaging,
ApJ, in press (arXiv:1103.5618)
10. Padovani, P.; Miller, N.; Kellermann, K. I.; Mainieri, V.; Rosati, P.; Tozzi, P. 2011
The VLA Survey of Chandra Deep Field South. V. Evolution and Luminosity Functions of Sub-millijansky Radio Sources and the Issue of Radio Emission in Radio-quiet Active Galactic Nuclei, ApJ, 740, 20
11. Raichoor, A.; Mei, S.; Stanford, S. A.; Holden, B. P.; Nakata, F.; Rosati, P. et al. 2011
Early-type galaxies at z. IV. Scaling relations in different environments,
A&A, in press (arXiv:1009.0284)
12. Jee, M. J.; Dawson, K. S.; Hoekstra, H.; Perlmutter, S.; Rosati, P. et al. 2011
Scaling Relations and Overabundance of Massive Clusters at z > 1 from Weak-lensing Studies with the Hubble Space Telescope, ApJ, 737, 59
13. Nastasi, A.; Fassbender, R.; Bhringer, H.; uhada, R.; Rosati, P. et al. 2011
Discovery of the X-ray selected galaxy cluster XMMU J0338.8+0021 at z = 1.49. Indications of a young system with a brightest galaxy in formation, A&A, 532, L6

14. Xue, Y.Q. et al. (25 coauthors including P. Rosati) 2011
The Chandra Deep Field-South Survey: 4 Ms Source Catalogs, ApJS, 195, 10
15. Santos, J.S.; Fassbender, R.; Nastasi, A.; Bhringer, H.; Rosati, P. et al. 2011
Discovery of a massive X-ray luminous galaxy cluster at z = 1.579, A&A, 531, L15
16. Suhada, R et al. (14 coauthors including P. Rosati) 2011
Exploring the galaxy cluster-group transition regime at high redshifts. Physical properties of two newly detected z > 1 systems, A&A, 530, 110
17. Kümmel, M.; Rosati, P.; Fosbury, R.; Haase, J.; Hook, R. N.; Kuntschner, H.; Lombardi, M.; Micol, A.; Nilsson, K. K.; Stoehr, F.; Walsh, J. R. et al. 2011
The Hubble Legacy Archive ACS grism data, A&A, 530A, 86
18. Rettura, A.; Mei, S.; Stanford, S. A.; Raichoor, A.; Moran, S.; Holden, B.; Rosati, P. et al. 2011
Early-type Galaxies at z ~ 1.3. III. On the Dependence of Formation Epochs and Star Formation Histories on Stellar Mass and Environment, ApJ, 732, 12
19. Yu, H.; Tozzi, P.; Borgani, S.; Rosati, P.; Zhu, Z.-H. et al. 2011
Measuring redshifts using X-ray spectroscopy of galaxy clusters: results from Chandra data and future prospects, A&A, 529, 65
20. Gilli, R.; Su, J.; Norman, C.; Vignali, C.; Comastri, A.; Tozzi, P.; Rosati, P. et al. 2011
A Compton-thick Active Galactic Nucleus at z 5 in the 4 Ms Chandra Deep Field South,
ApJ, 730, L28

Titarchuk Lev



Position: Professor
Period covered: 1st of November, 2010 to 1st of November of 2011

I Scientific Work

Study of spectral and timing properties of compact objects (neutron stars and black hole candidate sources).

II Conferences and educational activities

II a Conferences and Other External Scientific Work:

Participation and organization of X-ray meeting in Ferrara, Italy: ``X-ray Astrophysics up to 511 keV''. September 2011

II b Work With Students:

Simone Giaccne on X-ray spectral properties of AGN

II c Diploma thesis supervision:

Chiara Ceccobello, on X-ray spectra of soft Gamma repeaters (theory and numerical calculations and Caterina Lombardi: on the analysis of X-ray spectra of Cyg X-3. Derivation of correlation of photon index vs mass accretion rate

II d Other Teaching Duties:

Lectures on the courses of Mathematical Physics and High Energy Astrophysics

II e. Work With Postdocs:

Drs. Enrico Virgilli, Ruben Farinelli on spectral and timing properties of compact objects

2010-11 List of Publications

Cocchi, M., Farinelli, R., Paizis, A. & Titarchuk, L. ``Wide band observations of the X-ray burster GS 1826-2382010'', 2010, A&A, 509

Chardonnet, P., Chechetkin, V. & Titarchuk, L. ``On the pair-instability supernovae and gamma-ray burst phenomenon'', 2010, Ap&SS, 325, 153

Shrader, C. R., Titarchuk, L. & Shaposhnikov, N. `` New Evidence for a Black Hole in the Compact Binary Cygnus X-3'', 2010., ApJ, 718, 488

Seifina, E. & Titarchuk, L. ``On the Nature of the Compact Object in SS 433: Observational Evidence of X-ray Photon Index Saturation'', 2010, ApJ, 722, 586

Titarchuk, L. & Shaposhnikov, N. ``Implication of the Observed Spectral Cutoff Energy Evolution in XTE J1550-564'', 2010, ApJ, 724, 1147

Farinelli, R. & Titarchuk, L. ``On the stability of the thermal Comptonization index in neutron star low-mass X-ray binaries in their different spectral states'' 2011, A&A, 525, 102

Laurent, P. & Titarchuk, L. ``Spectral Index as a Function of Mass Accretion Rate in Black Hole Sources: Monte Carlo Simulations and an Analytical Description'', 2011, ApJ, 727, 34

Gliozzi, M. Titarchuk, L., Satyapal, S., Price, D. & Jang, I. ``Testing a Scale-independent Method to Measure the Mass of Black Holes'', 2011, ApJ, 713, 16

Seifina, E. & Titarchuk, L. ``On the Constancy of the Photon Index of X-Ray Spectra of 4U 1728-34 through All Spectral States'', 2011, ApJ, 738, 128

Aksenov Alexey

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

I. Scientific Work

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

II. Conferences and educational activities

2011: Les House Physics School April; Phys. of Neutron Stars, July St.-Petersburg; High Performance Computations Russian-Indian Workshop, October Moscow; 54-th scientific conference Moscow Institute of Physics and Technology, Nov Dolgoprudny; High Energy Astrophysics Dec Moscow
2010: Interaction of Intense Energy Fluxes, March, Elblus, Russia; The second Galileo - Xu Guangqi meeting, July, Nice and Ventimiglia; High Energy Astrophysics Dec Moscow

III. Service activities

Within ICRANet
2011 Visitor at Icranet one month

Outside ICRANet
1989—1992 engineer, Laboratory for Astrophysics and Plasma Physics of the Institute for Theoretical and Experimental Physics (ITEP); 1992—1999 Junior sci. staff member, ITEP; 1999—2008 scientific staff member, ITEP; 2008—now Senior scientific staff member, department for mathematical modeling and turbulence, Institute for Computer-Aid design, Russian academy of Sciences.
1993, 1997 2—3 months Visitor at Max-Planck Institute for Astrophysics, Garching, FRG; 2000/11—2001/10 Postdoc Fellow, Cond. Matt. Dept., Weizmann Institute of Science, Rehovot, Israel; 2002—2008 Visitor at Weizmann Institute of Science, Rehovot, Israel 1—3 months per a year

2011 List of Publications

Aksenov A.G., Chechetkin V.M. Computing the collapse of iron stellar cores with taking into account the absorption, emission scattering of electron neutrinos and antineutrinos. accepted in Astron. Report.

Alekseev George A.

Position: Leading researcher,
Steklov Mathematical Institute
of the Russian Academy of Sciences
Moscow, Russia
Period covered: 1975 – present time

I Scientific Work

Further development of the theory of integrable reductions of Einstein's field equations and its applications in General Relativity and gravity, string gravity and supergravity models in four and higher dimensions. This work includes a collaboration with Prof. V.A. Belinski on various aspects of soliton theory, construction and physical interpretation of exact solutions of Einstein and Einstein - Maxwell equations

II Conferences and educational activities

II a Conferences and Other External Scientific Work

International conference: "Classical and Quantum Integrable Systems"(CQIS-2011) -- Institute for High Energy Physics (Protvino, Russia) , January 24-27, 2011

Talk: G.A.Alekseev, " Integrability of symmetry reduced bosonic dynamics and solutions with rational monodromy data in heterotic string effective theory "

Abstract Integrable structure of the symmetry reduced dynamics of massless bosonic sector of heterotic string effective action is described. For string background equations that govern in space-times of $D\ge 4$ dimensions with $D-2$ commuting isometries the dynamics of interacting gravitational field, dilaton, antisymmetric tensor and any number $n\ge 0$ of Abelian vector gauge fields, all depending only on two coordinates, we construct an equivalent $(2d+n) \times (2 d+n)$ matrix spectral problem ($d=D-2$). We generalize for this spectral problem the monodromy transform approach (developed earlier for Einstein - Maxwell equations in four dimensions) and define the monodromy data which characterize uniquely any local solution. Then we construct an equivalent system of matrix linear singular integral equations which solve the inverse problem of this monodromy transform, i.e. which allow to determine the solutions of dynamical equations for arbitrary chosen monodromy data. It is shown that for a class of "analytically matched" rational monodromy data the solution of these integral equations and the corresponding solution of dynamical equations can be found explicitly.

Visits: 1. Pescara: 23.05.2011-03.06.2011
2. IHES (Paris, France): 10.10.2011 – 23.10.2011

2011 List of Publication

1. George A. Alekseev, "New soliton generating transformations in the bosonic sector of heterotic string effective theory", Proceedings of the Twelfth Marcel Grossmann Meeting on General Relativity, edited by Thibault Damour, Robert T Jantzen and Remo Ruffini, World Scientific, Singapore (2011) (3 pages)
Abstract In the author's paper (Phys.~Rev. {\bf D80}, 041901(R) (2009)), the integrable structure of the symmetry reduced bosonic dynamics in the low energy heterotic string effective theory was presented. In that paper, for a complete system of massless bosonic fields which includes metric, dilaton field, antisymmetric tensor and any number of Abelian vector gauge fields, considered in the space-time of D dimensions with $D-2$ commuting isometries, the spectral problem equivalent to the symmetry reduced

dynamical equations was constructed. However, the soliton generating transformations were described in that paper only for the case in which all vector gauge fields vanish. In this paper, we recall the integrability structure of these equations and describe some new type of soliton generating transformations in which the gauge fields can enter the background (seed) solution as well as these can be generated even on vacuum background by an appropriate choice of soliton parameters.

2. George A. Alekseev, “Thirty years of studies of integrable reductions of Einstein's field equations}, Proceedings of the Twelfth Marcel Grossmann Meeting on General Relativity”, edited by Thibault Damour, Robert T Jantzen and Remo Ruffini, World Scientific, Singapore (2011) (22 pages).
Abstract More than thirty years passed since the first discoveries of various aspects of integrability of the symmetry reduced vacuum Einstein equations and electrovacuum Einstein - Maxwell equations were made and gave rise to constructions of powerful solution generating methods for these equations. In the subsequent papers, the inverse scattering approach and soliton generating techniques, B\"acklund and symmetry transformations, formulations of auxiliary Riemann-Hilbert or homogeneous Hilbert problems and various linear integral equation methods have been developed in detail and found different interesting applications. Recently many efforts of different authors were aimed at finding of generalizations of these solution generating methods to various (symmetry reduced) gravity, string gravity and supergravity models in four and higher dimensions. However, in some cases it occurred that even after the integrability of a system was evidenced, some difficulties arise which do not allow the authors to develop some effective methods for constructing of solutions. The present survey includes some remarks concerning the history of discoveries of some of the well known solution generating methods, brief descriptions of various approaches and their scopes as well as some comments concerning the possible difficulties of generalizations of various approaches to more complicate (symmetry reduced) gravity models and possible ways for avoiding these difficulties.

3. G.A. Alekseev and V.A. Belinski, ``Soliton Nature of Equilibrium State of Two Charged Masses in General Relativity'', submitted to the International Journal of Modern Physics D (IJMPD)" (2011); http://arxiv.org/abs/1103.0582v1
Abstract New derivation of static equilibrium state for two charged masses in General Relativity is given in the framework of the Inverse Scattering Method as an alternative to our previous derivation of this solution by the Integral Equation Method. This shows that such solution is of solitonic character and represents the particular case of more general (12-parametric) stationary axisymmetric electrovacuum two-soliton solution for two rotating charged objects obtained by one of the authors in 1986. This result gives an additional support to our comprehension that the appropriate analytical continuations of solitonic solutions in the space of their parameters are always possible and that applicability of the Inverse Scattering Method in presence of electromagnetic field is not restricted only to the cases with naked singularities.

Bini Donato

Position: Reasercher at
Istituto per le Applicazioni del Calcolo,
"M. Picone," CNR
Viale Manzoni, 30 I-00185 Roma
Period covered: 1995 -today.

I Scientific Work

The main topic of my interest is General Relativity with special attention to several classical aspects, like the analysis and the interpretation of exact solutions of Einstein's field equations.
In particular, I'm interested in spacetime splitting techniques, measurement process and the role of the observer in General Relativity, particle dynamics in certain fixed gravitational backgrounds (either test particles with scalar structure: the mass or particles with internal structure: spinning test particles and particles with quadrupolar structure), gravitational perturbations, gravitational waves.
I'm an expert user of MAPLE™ tensor calculus package.

II Conferences and educational activities

Conferences and Other External Scientific Work

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

Diploma thesis supervision

I've been supervisor of the Diploma thesis of many 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.

Ph.D thesis supervision

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

Other Teaching Duties

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

Work With Postdocs

A Geralico, post-doc student at the University of Rome "La Sapienza."

III Service activities

Scientific collaboration with:
Prof. R. Ruffini (University of Rome, Italy and ICRANet);
Prof. R.T. Jantzen (Villanova Univesity, USA and ICRANet);
Prof. S. Filippi (University Campus Biomedico, Rome, Italy and ICRANet).
Dr. C. Cherubini (University Campus Biomedico, Rome, Italy and ICRANet).

Outside ICRANet

Scientific collaboration with:
Prof. F. de Felice (University of Padova, Italy);
Prof. L. Lusanna (INFN Florence, Italy);
Prof. P. Fortini (University of Ferrara);
Dr. A. Ortolan (INFN Legnaro, Padova);
Prof. O. Semerak (University of Prague);
Prof. T. Damour (IHES, paris).

Other
I'm currently doing referee activity for a large number of international journals in the field of General Relativity and I'm a reviewer for Mathreview.
For the years 2002-2004 I have been the leader of a collaboration project between the Italian Research Council (CNR) and the analogous institution in Venezuela. Title of the project: *Construction of 3d numerical models for the study of magnetohydrodynamics in gravitational physics and astrophysics*.
For the years 2007-2008 I have been the leader of young researchers projects of INDAM (Istituto Nazionale di Alta Matematica). Title of the project: *Light coordinates and spacetime topography*.
For the years 2008-2009 I have been the leader of young researchers projects of INDAM (Istituto Nazionale di Alta Matematica). Title of the project: *Sistemi di Posizionamento Globale relativistici*

2011 List of publications
Published papers

Bini D., Geralico A., Jantzen R.T.
Fermi coordinates in Schwarzschild spacetime: closed form expressions
General Relativity and Gravitation, vol. 43, 1837–1853 2011.

Bini D., Geralico A., Jantzen R. T.
Spin-geodesic deviations in the Schwarzschild spacetime
General Relativity and Gravitation, vol. 43, 959-975, 2011

Gizzi A., Bernaschi M., Bini D. , Cherubini C., Filippi S., Melchionna S., Succi S.
Three-band decomposition analysis of wall shear stress in pulsatile flows
Physical Review E vol. 83, 031902(10), 2011.

Bini D., Geralico A., Jantzen R. T., Semerak O. and Stella L.
The general relativistic Poynting-Robertson effect II: A photon flux with nonzero angular momentum
Classical and Quantum Gravity, vol. 28 035008 (21pp), 2011.

Bini D., Cherubini C., Filippi S.
Effective geometry of a white dwarf
Physical Review D, vol. 83, 064039 (15pp), 2011.

Bini D., de Felice F., Geralico A.
Accelerated orbits in black hole fields: the static case
Classical and Quantum Gravity, vol. 28 225012, 2011.

Bini D., Esposito G., Geralico A.
de Sitter spacetime: effects of metric perturbations on geodesic motion
General Relativity and Gravitation, to appear, 2011.
(DOI: 10.1007/s10714-011-1287-2)

Bini D. , Geralico A., Jantzen R. T. and Semerak O.

Effect of radiation flux on test particle motion in the Vaidya spacetime,
Classical and Quantum Gravity, to appear, 2011.

Bini D. and Geralico A.
Spin-geodesic deviations in the Kerr spacetime
Physical Review D, to appear, 2011.

Bini D., Geralico A., Jantzen R. T.
Separable geodesic action slicing in stationary spacetimes
General Relativity and Gravitation, to appear, 2011.

Bini D. , Fortini P., Haney M., Ortolan A.
Electromagnetic waves in gravitational wave spacetimes
Classical and Quantum Gravity, vol. 28, 235007, 2011.

Bini D. and Geralico A.
Scattering by an electromagnetic radiation field
submitted, 2011.

Bini D., Gregoris D. and Succi S.
Kinetic theory in a curved spacetime: applications to the Poynting-Robertson effect
submitted, 2011.

Filippi Simonetta

Position: Associate Professor (permanent) in Theoretical Physics(Fis/02).
Integrated Center for Research and
Vice-Dean, Biomedical Engineering faculty,
University "Campus Bio-Medico",
Email: s.filippi@unicampus.it
Affiliated of the American Physical Society and of the Italian Physical society

I Scientific Work

- Astrophysics of self-gravitating fluids.
- Cosmology.
- Numerical Relativity.
- Fluid dynamics
- Theoretical biophysics.

II Conferences and educational activities

2010/11 Lecturer "Mechanics and Thermodynamics" (Engineering Faculty, University Campus Bio-Medico of Rome).

2010/11 Lecturer "Complex Systems Dynamics" (Engineering Faculty, University Campus Bio-Medico of Rome).

III. Service activities

-Participation to the "Collegio di Dottorato" of the INTERNATIONAL RELATIVISTIC ASTROPHYSICS PH.D." by University of Rome "La Sapienza" (27th cycle).
-Participation to the "Collegio di Dottorato" of the INGEGNERIA BIOMEDICA PH.D." by University Campus Bio-Medico" of Rome (27th cycle).

IV. Other

Prof. Filippi has a longstanding collaboration with other ICRANETscientists. In particular in collaboration with Prof. Remo Ruffini she has written plenty articles on various aspects of Gravitational Physics. With Drs Christian Cherubini, Andrea Geralico and Donato Bini she is involved in research activities in the fields of Stellar and Galactic Structures, Effective Geometries and Complex Systems in Nature.

2011 List of Publications

1) CHERUBINI C, FILIPPI S (2011). Acoustic Metric of the Compressible Draining Bathtub. PHYSICAL REVIEW D, PARTICLES, FIELDS, GRAVITATION, AND COSMOLOGY, vol. 84, p. 084027-1-084027-12, ISSN: 1550-7998

2) BINI D, CHERUBINI C, FILIPPI S (2011). Effective geometry of a white dwarf. PHYSICAL REVIEW D, PARTICLES, FIELDS, GRAVITATION, AND COSMOLOGY, vol. 83, p. 064039-1-064039-15, ISSN: 1550-7998

3) A. GIZZI, M. BERNASCHI, D. BINI, CHERUBINI C, S. FILIPPI, S. MELCHIONNA AND S. SUCCI (2011). Three-band decomposition analysis of wall shear stress in pulsatile flows. PHYSICAL REVIEW E, STATISTICAL, NONLINEAR, AND SOFT MATTER PHYSICS, vol. 83, p. 031902-1-031902-10, ISSN: 1539-3755

4) CHERUBINI C, FILIPPI S (2011). Von Mises' potential flow wave equation and nonlinear analog gravity, PHYSICAL REVIEW D, PARTICLES, FIELDS, GRAVITATION, AND COSMOLOGY, accepted for publication.

Kim Sang Pyo

Position: Professor of Physics, Kunsan National University
Period covered: July 4-July 28, 2010

I. Scientific Work

1. attended the 2nd Galileo-XuGungQi Meeting and chaired two sessions.
2. the following paper and acknowledged Prof. Ruffini and ICRANet
Sang Pyo Kim (2011), ``Probing the Vacuum Structure of Spacetime,'' arXiv:1102.4154 [contribution to the 2nd Galileo-XuGungQi Meeting].

II. Conferences and educational activities

Conferences and Other External Scientific Works
attended the 2nd Galileo-XuGuang Qi Meeting and chaired two sessions.

2010 List of Publications

1. Sang Pyo Kim (2011), ``Probing the Vacuum Structure of Spacetime,'' arXiv:1102.4154 [contribution to the 2nd Galileo-XuGungQi Meeting].

2. Sang Pyo Kim and W-Y. Pauchy Hwang (2011), ``Vacuum Polarization and Persistence on the Black Hole Horizon,'' arXiv:1103.5264.

3. Sang Pyo Kim, Hyun Kyu Lee and Yongsung Yoon (2011), ``Pair Production Density in Strong QED,'' International Journal of Modern Physics: Conference Series, vol. 1, 303.

4. Sang Pyo Kim and Seoktae Koh (2011), ``Quantum Remnant as Dark Energy and Dark Matter,'' International Journal of Modern Physics: Conference Series, vol. 1, 277

5. Sang Pyo Kim (2011), ``QED effective action in magnetic field backgrounds and electromagnetic duality,'' Physical Review D 84, 065004

6. Sang Pyo Kim and Christian Schubert, ``Non-adiabatic Quantum Vlasov Equation for Schwinger Pair Production,'' arXiv:1110.0900 [to be published in Physical Review D]

7. Sang Pyo Kim, ``Schwinger Pair Production in Solitonic Gauge Fields,'' arXiv:1110.4684.

Kim Sung-Won

Position: Professor in Ewha Womans University, Seoul, Korea
Period covered: Since 1985

I. Scientific Work

Publication in 2011

1. Moon-hee Kim, Miyoung Cho, Sung-Won Kim, A study of the Science Curriculum in Elementary Teacher Education and In-service teachers' Perceptions of the Curriculum, Research in Curriculum Instruction, 15(2), 473-492 (2011).
2. Kyunghee Choi, Hyunju Lee, Namsoo Shin, Sung-Won Kim, Joseph Krajcik, Re-Conceptualization of Scientific Literacy in South Korea for the 21st Century, Journal of Research in Science Teaching, 48(6), 670–697 (2011).
3. Ji-Hyun Yoon, Kongju Mun, Sung-Won Kim, Exploration of Physics Teachers' Perceptions of Idealization, Journal of Korea Association on Science Education, 31(5), 801-814 (2011).
4. Yoonjeong Oh, Jiyoung Jang, Hyosuk Ryu, Sung-Won Kim, Hyunju Lee, Kyunghee Choi, Analyses and Comparison between Science Content on Education for Sustainable Development in High School, Science Curriculum of 2007-Revised and 2009-Revised Journal of Learner-Centered Curriculum and Instruction, 11(2), 95-113 (2011).
5. Sung-Won Kim, Teaching Methods for Special Relativity Using Spacetime Diagram, Journal of Korea Society for School Science, 5(2), 65-72 (2011).
6. Sung-Won Kim, Soo Jung Lee, Sung-Youn Choi, Level of High School Physics Teacher's Understanding of Fundamental Physical Constants and Their Educational Application, Journal of Korea Association on Science Education, 31(6), 848-863 (2011).
7. Hyunju Lee, Hyunsook Chang, Kyunghee Choi, Sung-Won Kim & Dana L. Zeidler, Developing Character and Values for Global Citizens: Analysis of pre-service science teachers' moral reasoning on socioscientific issues, International Journal of Science Education. (2011).

II. Conferences and educational activities

II a. Conferences and Other External Scientific Works

1. 2011 Shanghai Asia-Pacific School and Workshop on Gravitation, February 10-14, 2011, Shanghai, China.
2. 2011 National Association of Research in Science Teaching, April 4-7, Orlando, FL, USA.
3. Korean Physical Society Spring Meeting, April 13-15, 2011, Daejon, Korea.
4. 12th Italian-Korean Relativistic Astrophysics Meeting, July 4 – 9, 2011, Pescara, Italy.
5. 2011 European Science Education Research Association Meeting, September 4-9, Lyon, France.
6. Korean Physical Society Fall Meeting, October 19-21, 2011, Busan, Korea.
7. 2011 East-Asian Science Education Conference, October 25-29, 2011, Gwangju, Korea
8. Black Hole: New Horizons, November 20-25, 2011, Banff, Canada.
9. Asia-Pacific International Workshop on Physics Education, December 2-3, 2011, Seoul, Korea.
10. International Conference on Gravitation and Astrophysics, December 17-22, Qui Nohn, Vietnam.

II b. Work With Students

Research on Physics (Astrophysics) and Science Education

II c. Diploma thesis supervision

3 Master Degree Students

II d. Other Teaching Duties

3 courses in each semester (Quantum Physics I & II, General Science, Science Math, Classical Mechanics Education)

II e. Work With Postdocs

Work on Science Education with 2 Postdocs.

III. Service activities

Outside ICRANet

1. Chair of Korean Physics Olympiad Committee (KPS)
2. President of Korean Society for School Science (KOSSS)

Lee Hyung Won

Position: Professor, Inje Universiyt
Period covered: 26 June 2011 – 10 July 2011

I Scientific Work

1. Dark energy
2. Exact solution of Einstein equations
3. Numerical Relativity

II Conferences and educational activities

II a Conferences and Other External Scientific Work

1. 2011 Shanghai Asia-Pacific School and Workshop on Gravitation, Shanghai, 10-14 February 2011
2. The 12th Italian-Korean Symposium for Relativistic Astrophysics, Pescara, 4 July 2011 ~ 8 July 2011.
3. III Galileo-Xu GuangQi Meeting, Beijing, October 11-15 2011.

2011 List of Publication

1. Kyoung Yee Kim, Hyung Won Lee and Yun Soo Myung "On the ricci dark energy model", Gen. Rel. Grav. 43, 1095(2011).

2. Hyung Won Lee, Kyoung Yee Kim and Yun Soo Myung, "Future cosmological evolution in f(R) gravity using two equations of state parameters", Eur. Phys. J. C71, 1748(2011).

3. Hyung Won Lee, Kyoung Yee Kim and Yun Soo Myung, "Equations of state in the Brans-Dicke cosmology", Eur. Phys. J. C71, 1585(2011).

4. Tae-gu Kim, Young-sig Kang and Hyung-won Lee, "A study on industrial accident rate forecasting and program development", Ind. Health 49, 56(2011).

5. Hyung Won Lee, Yong-Wan Kim and Yun Soo Myung, "Slowly rotating black holes in the Hoˇrava–Lifshitz gravity", Eur. Phys. J. C70, 367(2010).

6. Hyung Won Lee, Yong-Wan Kim and Yun Soo Myung, "Extremal black holes in the Horava–Lifshitz gravity", Eur. Phys. J. C68, 255(2010).

Malheiro Manuel

Position: Associate Professor
Physics Department, Instituto Tecnologico de Aeronautica (ITA),
Sao Jose dos Campos, Sao Paulo, Brazil
Period covered: 1/November/2010 to 31/October/2011

I Scientific Work

I spent one year at "La Sapienza" University and ICRA in Rome, supported by Fundacao de Apoio a Pesquisa no Estado de Sao Paulo, Brazil (FAPESP) and ICRANET-Brasil, during my sabbatical year 2010/2011 from the Instituto Tecnologico de Aeronautica (ITA). I work together with Profs. Remo Ruffini and Jorge Rueda, and also co-advise the PhD thesis of Luis Juracy Rangel Lemos
A new model was developed to explain the energetic, steady emission, and burst activity of the Soft Gamma Repeaters (SGRs) and Anomalus X-Ray pulsars (AXPs). It has been shown that the energetic of these stars can be well understood as rotation powered massive white dwarfs, in perfect analogy with the case of pulsars originating their energy from the rotational energy of the neutron stars. Thus, our model is clear different from the usual interpretation of these sources as neutron stars (magnetars), where the strong magnetic field decay is needed to explain their luminosities and outburst activities. In other words, our model indicates that magnetares - neutron star pulsars with huge magnetic fields, - do not exist. The results of these work are in the paper "SGRs and AXPs as rotation powered massive white dwarfs" , by Manuel Malheiro, Jorge A. Rueda, and Remo Ruffini, accepted in Publications of Astronomical Society of Japan (PASJ) . These work has been improved during all the year of 2011, and its six versions can be seen in http://arxiv.org/abs/1102.0653 .

I also investigate with my collaborators of Brazil the hadron-quark phase transition, matching relativistic quantum hadrodynamics mean-field models, RMF (in the hadronic phase) with the more updated versions of the Polyakov-Nambu-Jona-Lasinio models, PNJL (in the quark phase). We showed that the predicted hadronic phases of the RMF-PNJL matching are larger than the confined phase obtained exclusively by the PNJL quark models. This important result is due to the effect of the repulsive part of the nuclear force that causes more resistance of hadronic matter to isothermal compressions. We conclude that studies of the confinement transition in nuclear matter done only with quark models - neglecting hadron degrees of freedom - can be not reliable. This study has important consequences in the internal matter composition of proton-neutron stars where the temperature plays a role in the possible formation of a quark matter stellar core, something that will be investigate in future works. This work is in the paper " The hadron-quark phase transition in a hadronic and PNJL models perspective.", by O. Lourenco, M. Dutra, A. Delfino, and M. Malheiro, accepted for publication in Physical Review D (the pdf file is enclosed).

Finally, I work togheter with the student Juracy Lemos in his PhD thesis " Luminosity function of GRBs and particle creation from proton-proton interactions" , in particular in the final chapter concerning hadron production in pp collisions and applications to Gamma Ray Burst (GRBS) , where the pioneer Fermi model for pion production is compared with more sophisticate model calculations of hadron production in intermediate and high energy proton-proton collisions.

II Conferences and educational activities

II a Conferences and Other External Scientific Work

1. IRAP PhD Eramus Mundus Workshop " Recent News from the MeV, GeV and TeV Gamma-Ray Domains" , March 21-26, Pescara (Italy)
http://www.icranet.org/index.php?option=com_content&task=view&id=574

2. IRAP PhD Eramus Mundus Workshop "From Nuclei to White Dwarfs and Neutron Stars", April 3-8,2011LesHouches(France)
http://www.icranet.org/index.php?option=com_content&task=view&id=557

3. Workshop "Gravitational Waves and Electromagnetic Radiation from Compact Stars" , Catania, Italy, May 3-12, 2011, http://agenda.ct.infn.it/conferenceDisplay.py?confId=491
Meeting from the compstar ENSF network http://compstar-esf.org/

4. " The X-Ray Universe 2011" Symposium, June 27-30, 2011, Berlin, Germany
ESA and XMM-Newton meetings http://xrayuniverse.esa.int/

II b Work With Students

II c Diploma thesis supervision

Co-advisor work of the PhD thesis " Luminosity function of GRBs and particle creation from proton-proton interactions" of Luis Juracy Rangel Lemos, presented at La Sapienza University of Rome, December, 15th, 2011, Thesis Advisor: Prof. Remo Ruffini, Co-advisor: Dr. Carlos Luciano Bianco and Prof. Manuel Maximo Bastos Malheiro de Oliveira.

III. Service activities

III a. Within ICRANet

Participation in the seminarsof ICRA and ICRANet, and in the ICRANET IRAP PhD Erasmusm Mundus workshops of Pescara and les Houches, with two talks about "SGRs and AXPs: massive rotating white dwarfs."

III b. Outside ICRANet

Participation in the COMPSTAR ENSF network , with the talk " SGRs and AXPs: massive rotating white dwarfs versus magnetares" at the meeting Gravitational Waves and Electromagnetic Radiation from Compact Stars, Catania, Italy, May 3-12, 2011

2011 List of Publication

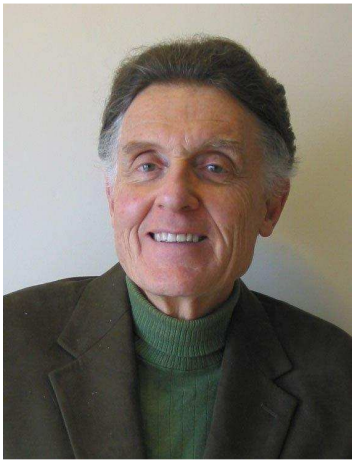
1. SGRs and AXPs as rotation powered massive white dwarfs, M. Malheiro, J. Rueda, and R. Ruffini, accepted in Publications of the Astronomical Society of Japan, PASJ (2011)

2. The hadron-quark phase transition in a hadronic and PNJL models perspective., O. Lourenco, M. Dutra, A. Delfino, and M. Malheiro, accepted for publication in Physical Review D (2011)

3. SGRs and AXPs: White Dwarf Pulsars versus Magnetares, M. Malheiro, J. Rueda, and R. Ruffini, "The X-ray Universe 2011, Presentations of the Conference held in Berlin, Germany, 27-30 June 2011. Available online at: http://xmm.esac.esa.int/external/xmm_science/workshops/2011symposium/, article id.248" Bibliographic Code: 2011xru..conf..248M

4. The effects of charge on the structure of strange stars, M. Malheiro, R. P. Negreiros, F. Weber, and V. Usov, J. Phys. Conf. Ser. 312:042018 (2011), 24th International Nuclear Physics Conference (INPC 2010), Vancouver, Canada, 4-9 July 2010, http://iopscience.iop.org/1742-6596/312/4/042018/

Ohanian Hans C.



Position: Adjunct Professor (Physics), University of Vermont
Period covered: Jan. 2011-Nov. 2011

I Scientific Work

New (third) edition of Ohanian and Ruffini, *Gravitation and Spacetime*, to be published by Cambridge University Press next year.

"A Comment on Mermin's 'Understanding Einstein's 1905 derivation of $E = Mc^2$' ", submitted to Studies in History and Philosophy of Modern Physics.

"Comment on 'How Einstein confirmed $E_0 = mc^2$' ", by E. Hecht [Am J. Phys. **79 (6)**, 591-600 (2011)], submitted to Am. J. Phys.

II. Other

Colloquium, "Einstein's Mistakes," Rensselaer Polytechnic Institute, Troy, NY, April 2011.
Colloquium, "Einstein's Mistakes," University of Connecticut, Storrs, CT, November 2011.

2011 List of Publications

H. C. Ohanian, "Gravitation and Spacetime: Einstein's Contribution," to be published in *Proceedings of the International Conference on Two Cosmological Models, Universidad Iberoamericana, Mexico City, November, 2010.*

H. C. Ohanian, "Problems with Conformal Gravity," to be published in *Proceedings of the International Conference on Two Cosmological Models, Universidad Iberoamericana, Mexico City, November, 2010.*

H. C. Ohanian, "Reversed Gravitational Acceleration for High-Speed Particles," arXiv:1102.2870, Feb. 2011.

Perez Bergliaffa Santiago Esteban

Position: Professor, Department of Physics, University of the State of Rio de Janeiro
Period covered: 2010-2011

I. Scientific Work

Static and spherically symmetric black holes in f(R) theories.
Santiago Esteban Perez Bergliaffa, Yves Eduardo Chifarelli de Oliveira Nunes, Phys.Rev. D84 (2011) 084006, arXiv:1107.5727

Effective metric in nonlinear scalar field theories, E. Goulart, Santiago Esteban Perez Bergliaffa
arXiv:1108.3237
Accepted for publication in PRD

An analysis of a regular black hole interior. Daniela Perez, Camila A. Correa, Santiago E. Perez-Bergliaffa, Gustavo E. Romero. arXiv:1111.0690 [astro-ph.CO]
Manuscript being reviewed for publication in PRD

An Overview of f(R) theories.
Santiago Esteban Perez Bergliaffa
e-Print: arXiv:1107.5183 [gr-qc]
Talk given at the XIV BSCG, to be published in the proceedings by CUP.

Nonsingular cosmological models.
Santiago Esteban Perez Bergliaffa.
e-Print: arXiv:1105.5424 [gr-qc]
Talk given at the LARIM 2010, to be published in the proccedings by the Mexican Journal of Physics.

II. Conferences and educational activities

II a Conferences and Other External Scientific Work

Static and spherically symmetric) black holes in f(R) theories, talk given at the 19th International Conference on General Relativity and Gravitation (GR 19), México City, July
2010.

The dark side of the universe, talk for students given at the "Week of Physics" at the University of the State of Rio de Janeiro.(2010).

La métrica efectiva y sus aplicaciones, talk given at the Departamento de Física,
Centro de Investigación y de Estudios Avanzados del Instituto Politécnico Nacional
(Cinvestav), DF, México, July 21, 2010.

Member of the Organizing Committee of the XIV Brazilian School of Cosmology and
Gravitation, Rio de Janeiro, September 2010.

Member of the Scientific Committee of the Friedman Seminar, Rio de Janeiro, May 2011.

Member of the Organizing Committee of the Primera Reunión Argentino-Brasileña de Gravitación, Astrofísica y Cosmologia, Foz do Iguaçu, october 2011.

II b Work With Students
1) Introduction to scientific research (program for advanced bachelor students)
Vitor Silva Tavares, Inhomogeneous Cosmology (UERJ).

Diana Fernandes Carelli Gomes, Black Holes and gravity in the strong-curvature regime (UERJ).

Daiana Silva, Compact Objects, (UERJ).

II c Diploma thesis supervision
Claudia Isabel Azucena P. Rivasplata, "Applications of the effective metric", PhD in Physics, co-advisor: José Salim (CBPF).

Florencia Anabella Teppa Pannia, "Cosmology and inhomogeneous models", PhD in Astronomy (University of La Plata, Argeitnia) – advisor.

Márcio Oliveira Pinheiro, "Limits on theories of gravity in the strong-field regime",
MSc in Physics (UERJ), advisor.

Ana Paula Cardozo Correia, "Observable effects of Bohmian Mechanics", MSc in Physics, (UERJ), advisor.

II d Other Teaching Duties
I taught several courses at the graduate and post-graduate level in the Institute of Physics of the UERJ.
Gravitation and Astrophysics with the GRTensor, course, 20 hs, Facultad de Ciencias Astronómicas y Geofísicas, La Plata, Argentina, March 2010.

III. Service activities
Vice-coordinator of the Post-graduation programme of the Instituto de Física (UERJ).

IV. Other
Edition of the Proccedings of The Sun, the Stars, the Universe, and General Relativity (Sobral 2009), to be published in 2011 by Cambridge U. Press.
Reviewer of Classical and Quantum Gravity

Reviewer of International Journal of Theoretical Physics

Vissani Francesco

Position: Senior INFN researcher.
Head of Gran Sasso Theory group since 2006.
ICRANet lecturer since October 2009
Period covered: 2009-2011

Scientific Interests

Neutrinos in particle physics and astrophysics. Models of neutrino signal from gravitational collapse. Connection with gravity wave search. Very high energy neutrinos from supernova remnants. Phenomenology of extensions of the standard model of elementary particles.

Conferences and educational activities

Conferences in 2011

Apr.: Multi-Messenger Astronomy of Cosmic Raysm KIAA, Beijing: talk on TeV neutrinos from SNR: How to get predictions with error-bars?
May: RICAP 2011, talk on Expectations for High-Energy Neutrinos from Galactic Sources
June: lectures on neutrino physics at the PhD course of Milano University
July: 1st CAPPA Summer School on High Energy Astrophysics, Dublin, Ireland; lecture on Progresses in Neutrino Astronomy
July: International Neutrino Summer School 2011, Geneva, Switzerland; lecture on The Standard Model and the current physics scene at the beginning of LHC
September: SIF XCVII Congresso Nazionale, talk on Aspettative per i neutrini galattici di alta energia.
October: Frontiers in Neutrino Physics, Paris, France: talk on SN1987A, was it what we expected?

Conferences in 2010

May: Frontier Objects in Astrophysics and Particle Physics (Vulcano 2010 Workshop) Vulcano, Italy; talk on What is the Issue with SN1987A Neutrinos?
June: Organization of the meeting in honor of G. Senjanovic The Joy of Making Physics (Goranfest) at Split, Croatia.
July: The sun, the stars, the universe and general relativity (second Galileo-Xu Guangqi meeting), Ventimiglia, Italy; talk on Progresses in Neutrino Astronomy.
September: National meeting of the Italian Physics Society (SIF) Bologna, Italy: talk on High Energy Neutrino Astronomy: From the Hope for Surprises to Predictions.
October: Second PHYSUN Workhop, LNGS, Italy: Summary talk.

Work with students

Advisor of Giulia Pagliaroli. PhD thesis on supernova neutrinos, defended with success on April 2009 at L'Aquila University. Since December 2009, Giulia joined the theory group of Gran Sasso with a postdoc contract.
Advisor of Andrea Lami, Rome 3 U., for a diploma thesis on electroweak reactions.
Collaborated with Fernando Rossi Torres, student at Campinas University, Brazil on supernova data analysis and neutrino mass studies.

Collaborated with Maria Laura Costantini, ICRANet, Pescara, on neutrinos from SN1987A.
Collaborated with Narek Sahakyan, ICRANet, Pescara and Rome U., on high energy neutrinos and gamma rays.

Other commitments

SIF referent person at LNGS since 2009.

Coordinator for LNGS of the Virgo-EGO Science Forum (VESF) since April 2009.

Member of the scientific committee for the ICRANet-INFN agreement.

INFN representative in the Science Advisory Committee (SAC) of ApPEC/ASPERA.

Member of the scientific council of the Groupement de Recherche Neutrino (CEA and IN2P3)

List of Scientific Works

On the generality of the Cohen and Glashow constraints on the neutrino velocity.
F.L. Villante, F. Vissani.
e-Print: arXiv:1110.4591 [hep-ph]

Supernova neutrinos and gravitational waves.
G. Pagliaroli, F. Vissani.
Nucl.Phys.Proc.Suppl. 217 (2011) 278-280

A parameterized model for supernova electron antineutrino emission and its applications.
Francesco Vissani, Giulia Pagliaroli, Maria Laura Costantini (ICRA, Pescara).
J.Phys.Conf.Ser. 309 (2011) 012025

Neutrinoless Double Beta Decay and Heavy Sterile Neutrinos.
Manimala Mitra, Goran Senjanovic, Francesco Vissani
e-Print: arXiv:1108.0004 [hep-ph]

A Step toward CNO solar neutrinos detection in liquid scintillators.
F.L. Villante, A. Ianni, F. Lombardi, G. Pagliaroli, F. Vissani
Phys.Lett. B701 (2011) 336-341

LEFT-RIGHT SYMMETRY: FROM LHC TO NEUTRINOLESS DOUBLE BETA DECAY.
V. Tello, M. Nemevsek, F. Nesti, G. Senjanovic, F. Vissani.
Phys.Rev.Lett. 106 (2011) 151801.

THE DIFFUSE SUPERNOVA NEUTRINO BACKGROUND: EXPECTATIONS AND UNCERTAINTIES DERIVED FROM SN1987A.
F. Vissani, G. Pagliaroli.
A&A 528 (2011) L1

ON THE DETECTABILITY OF HIGH-ENERGY GALACTIC NEUTRINO SOURCES.
F. Vissani, F. Aharonian, N. Sahakyan.
Astropart.Phys. 34 (2011) 778-783

WHAT IS THE ISSUE WITH SUPERNOVA NEUTRINOS?
F. Vissani, M.L. Costantini, A. Ianni, G. Pagliaroli.
Proc. of the Vulcano 2010 workshop.

USING SUPERNOVA NEUTRINOS TO MONITOR THE COLLAPSE, TO SEARCH FOR GRAVITY WAVES AND TO PROBE NEUTRINO MASSES.
F. Vissani, G. Pagliaroli, F. Rossi-Torres.
Proc.of the 1st Galileo – Xu Guangqi meeting.

NEUTRINO MASS BOUND IN THE STANDARD SCENARIO FOR SUPERNOVA ELECTRONIC ANTINEUTRINO EMISSION.
Giulia Pagliaroli, Fernando Rossi-Torres, Francesco Vissani.
Astropart. Phys. 33 (2010) 287.

SEARCHING FOR PROMPT SIGNATURES OF NEARBY CORE-COLLAPSE SUPERNOVAE BY A JOINT ANALYSIS OF NEUTRINO AND GRAVITATIONAL-WAVE DATA.
Isabel Leonor et al., including Francesco Vissani.
Class. Quant. Grav. 27 (2010) 084019.

ON THE GOALS OF NEUTRINO ASTRONOMY.
F. Vissani, G. Pagliaroli, F.L. Villante.
Nuovo Cim. C32 (2009) 353.

COSMIC RAYS AND NEUTRINOS FROM SUPERNOVA REMNANTS FROM VHE GAMMA RAY DATA.
F.L. Villante, F. Vissani.
Nucl.Phys.Proc.Suppl. 188 (2009) 261.

NEUTRINI DALLO SPAZIO (in Italian)
G. Pagliaroli, F.L. Villante, F. Vissani.
Nuovo Saggiatore 25, no.3-4 (2009), 5-19.

THE LIKELIHOOD FOR SUPERNOVA NEUTRINO ANALYSES.
A. Ianni, G. Pagliaroli, A. Strumia, F.R. Torres, F.L. Villante, F. Vissani.
Phys.Rev.D80 (2009) 043007

NEUTRINOS FROM SUPERNOVAE AS A TRIGGER FOR GRAVITATIONAL WAVE SEARCH.
G. Pagliaroli, F. Vissani, E. Coccia, W. Fulgione.
Phys.Rev.Lett.103 (2009) 031102

IMPROVED ANALYSIS OF SN1987A ANTINEUTRINO EVENTS.
G. Pagliaroli, F. Vissani, M.L. Costantini, A. Ianni.
Astropart.Phys.31 (2009) 163

FEATURES OF KAMIOKANDE-II, IMB AND BAKSAN OBSERVATIONS AND THEIR INTERPRETATION IN A 2-COMPONENT MODEL FOR THE SIGNAL.
Francesco Vissani and Giulia Pagliaroli.
Astronomy Letters 35 (2009) 1.

Wiltshire David L.

Position: Associate Professor, Department of Physics & Astronomy,
University of Canterbury, Christchurch, New Zealand
Period covered: 29 July 2008 – 30 October 2008

2011 List of Publications

P.R. Smale and D.L. Wiltshire,
"Supernova tests of the timescape cosmology",
Mon. Not. R. Astron. Soc. 413 (2011) 367-385.

D.L. Wiltshire,
"What is dust ? - Physical foundations of the averaging problem in cosmology",
Class. Quantum Grav. 28 (2011) 164006.

D.L. Wiltshire,
"Dark energy from cosmic structure",
in Proceedings of the 12th Marcel Grossmann Meeting on General Relativity, eds. T. Damour, R.Ruffini and R. Jantzen, (World Scientific, Singapore, 2011) .

D.L. Wiltshire,
" Gravitational energy as dark energy: Cosmic structure and apparent acceleration",
in Proceedings of the Conference on Two Cosmological Models, ed. J. Auping, (Universidad Iberoamericana, Mexico City, 2011)

Cherubini Christian

Position: **University Researcher** (permanent) in Theoretical Physics (FIS/02).
Integrated Center for Research
Biomedical Engineering faculty,
University "Campus Bio-Medico",
Via A. del Portillo 21, I-001285 Rome, Italy.

Period covered: 1st November 2007-today

I Scientific Work

- Astrophysics of self-gravitating fluids.
- General relativistic perturbation theory.
- Cosmology.
- Numerical Relativity.
- Fluid dynamics
- Theoretical biophysics.

II Conferences and educational activities

2010/11 Lecturer "Physics" (Alimentation and Human Nutrition Sciences, Medicine Faculty, University Campus Bio-Medico of Rome).
2010/11 Lecturer "Mathematical Physics Models for Engineering" (Engineering Faculty University Campus Bio-Medico of Rome).

III. Service activities

-Participation to the "Collegio di Dottorato" of the INTERNATIONAL RELATIVISTIC ASTROPHYSICS PH.D." by University of Rome "La Sapienza" (27th cycle).
-Participation to the "Collegio di Dottorato" of the INGEGNERIA BIOMEDICA PH.D." by University Campus Bio-Medico" of Rome (27th cycle).

Other

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

2011 List of Publications

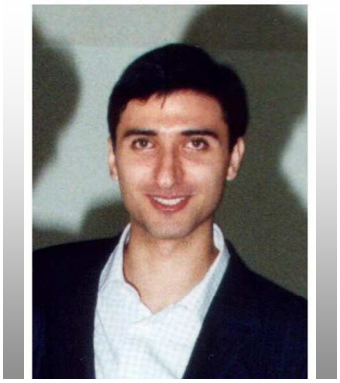
1) CHERUBINI C, FILIPPI S (2011). Acoustic Metric of the Compressible Draining Bathtub. PHYSICAL REVIEW D, PARTICLES, FIELDS, GRAVITATION, AND COSMOLOGY, vol. 84, p. 084027-1-084027-12, ISSN: 1550-7998

2) BINI D, CHERUBINI C, FILIPPI S (2011). Effective geometry of a white dwarf. PHYSICAL REVIEW D, PARTICLES, FIELDS, GRAVITATION, AND COSMOLOGY, vol. 83, p. 064039-1-064039-15, ISSN: 1550-7998

3) A. GIZZI, M. BERNASCHI, D. BINI, CHERUBINI C, S. FILIPPI, S. MELCHIONNA AND S. SUCCI (2011). Three-band decomposition analysis of wall shear stress in pulsatile flows. PHYSICAL REVIEW E, STATISTICAL, NONLINEAR, AND SOFT MATTER PHYSICS, vol. 83, p. 031902-1-031902-10, ISSN: 1539-3755

4)) CHERUBINI C, FILIPPI S (2011). Von Mises' potential flow wave equation and nonlinear analog gravity, PHYSICAL REVIEW D, PARTICLES, FIELDS, GRAVITATION, AND COSMOLOGY, accepted for publication.

Geralico Andrea



Position: Postdoc
Period covered: October 1st, 2006 – present

I Scientific Work

1 $3+1$ splitting of spacetime: measurement processes and the role of observers in general relativity;

2 test particle dynamics in black hole spacetimes; motion of small extended bodies (neutral or charged test particle endowed with an internal structure described by its spin and quadrupole moment);

3 general relativistic perturbation theory of Einstein-Maxwell systems;

4 exact solutions of Einstein's field equations;

5 gravitational lensing techniques in strong gravitational fields;

II Conferences and educational activities

Conferences and Other External Scientific Work

ICRANet Workshops 2001-2010
Xth Brazilian School of Cosmology and Gravitation (Rio de Janeiro, Brazil, 2002)
XIth Marcel Grossmann Meeting (Berlin, DE, 2006)
APS April Meeting (Jacksonville, US, 2007)
XIIth Marcel Grossmann Meeting (Paris, FR, 2009)
Vth Australasian Conference on General Relativity and Gravitation (Christchurch, NZ, 2009)

2011 List of publications

1) Bini D., Geralico A., Jantzen R. T., Semerak O. and Stella L.,
The general relativistic Poynting-Robertson effect: II. A photon flux with nonzero angular momentum
Classical and Quantum Gravity, vol. 28, 035008, 2011.
2) Bini D., Geralico A. and Jantzen R. T.,
Spin-geodesic deviations in the Schwarzschild spacetime,
Gen. Relativ. Gravit., vol. 43, 959, 2011.
3) Bini D., Geralico A. and Jantzen R. T.,
Fermi coordinates in Schwarzschild spacetime: closed form expressions,
Gen. Relativ. Gravit., vol. 43, 1837, 2011.
4) Bini D., de Felice F., Geralico A.,
Accelerated orbits in black hole fields: the static case,
Classical and Quantum Gravity, vol. 28, 225012, 2011.
5) Bini D. and Geralico A.,
Spin-geodesic deviations in the Kerr spacetime,
to appear in Physical Review D, 2011.
6) Bini D., Geralico A., Jantzen R. T. and Semerak O.,
Effect of radiation flux on test particle motion in the Vaidya spacetime,
to appear in Classical and Quantum Gravity, 2011.
7) Bini D., Esposito G. and Geralico A.,
de Sitter spacetime: effects of metric perturbations on geodesic motion,

to appear in Gen. Relativ. Gravit., 2011.
8) Bini D., Geralico A. and Jantzen R. T.,
Separable geodesic action slicing in stationary spacetimes,
to appear in Gen. Relativ. Gravit., 2011.

Lattanzi Massimiliano

Position: ICRA Postdoctoral fellow (assegnista di ricerca) at the Physics Department, "Sapienza" University of Rome
Period covered: January 2011– July 2011

I. Scientific Work

- Study of inflationary models with a step-like feature in the inflaton potential. We have obtained constraints for the step parameters from present data (WMAP7 and ACT) and performed forecast for future experiments (Planck).
- Study of modified gravity models. We have investigated the cosmological viability of a non analytical f(R)-gravity model.

II. Conferences and educational activities

II a. Conferences and Other External Scientific Works

Talks presented in international conferences:

- "*Features in the spectrum of primordial perturbations: new constraints from WMAP7+ACT data and prospects for Planck*", 12th Italian-Korean Symposium on Relativistic Astrophysics, Pescara (Italy), July 4-8, 2011.

II b. Work With Students

I have been working with IRAP Ph.D. students Stefania Pandolfi and Micol Benetti.

III. Service activities

Within ICRANet

ICRA Post-doc at the Physics Department, University of Rome "Sapienza" until June 30th, 2011.

2011 List of Publications

1. Salvatore Capozziello, Nakia Carlevaro, Mariafelicia De Laurentis, Massimiliano Lattanzi, Giovanni Montani, "*Cosmological implications of a viable non-analytical f(R)-gravity model*", arXiv:1104.2169 [astro-ph.CO]

2. Micol Benetti, Massimiliano Lattanzi, Erminia Calabrese, Alessandro Melchiorri, "*Features in the primordial spectrum: new constraints from WMAP7+ACT data and prospects for Planck*", Phys.Rev. D84 (2011) 063509.

Rotondo Michael

Position: Post-doctoral researcher
Period covered: 2011

I Scientific Work

Supercritical electric fields in nuclei and neutron stars
Electrodynamical properties of white dwarfs and neutron stars

II Conferences and educational activities

II a Conferences and Other External Scientific Work

1) Italian-Korean Symposium on Relativistic Astrophysics, 4-8 July 2011, Pescara (Italy): participant with the talk *The relativistic Feynman-Metropolis-Teller treatment for finite temperatures.*

2) IRAP Ph.D. and Erasmus Mundus Workshop: Recent news from MeV, GeV and TeV gamma rays domain: results and interpretations, 21-26 March 2011, Pescara (Italy): participant with the talk *From atoms to nuclear matter cores of stellar dimensions: a unified approach based on the relativistic Thomas-Fermi model*.

II b Other Teaching Duties

Teacher assistant of the course "Collasso gravitazionale, buchi neri, polarizzazione del vuoto e cosmologia" held by Prof. Remo Ruffini at Physics Department of the University "Sapienza", Rome, Italy, academic year 2010/2011.

Member of the examining committee chaired by Prof. Remo Ruffini at Physics Department of the University "Sapienza", Rome, Italy, academic year 2010/2011.

2011 List of Publications

1) Rotondo M., Rueda J., Ruffini R., Xue S.-S., Phys. Rev. D, Vol. 84, 084007,2011

2) Rotondo M., Rueda J., Ruffini R., Xue S.-S., Phys. Lett. B, Vol. 701, 667, 2011.

3) Rotondo M., Rueda J., Ruffini R., Xue S.-S., Phys. Rev. C, Vol. 83, 045805, 2011.

4) Rueda J., Rotondo M., Ruffin R. and Xue S.-S., *The extended nuclear matter model with smooth transition surface* in Proceedings of the Third Stueckelberg Workshop on Relativistic Field Theories, N. Carlevaro R. Ruffini and G. W. Vereshchagin (eds.), p. 287 (Cambridge Scientific Publisher, 2010).

5) Rotondo M., Ruffini R. and Xue S.-S., *Analytic solutions of the ultra-relativistic Thomas-Fermi equation* in Proceedings of the Third Stueckelberg Workshop on Relativistic Field Theories, N. Carlevaro, R. Ruffini and G. W. Vereshchagin (eds.), p. 281 (Cambridge Scientific Publisher, 2010).

6) Boskhayev K., Rotondo M., Ruffini R., *On Magnetic Fields in Rotating Nuclear Matter Cores of Stellar Dimensions*, in PoS PROCEEDINGS of SCIENCE (Texas Symposium 2010, Heidelberg (Germany)), 275

7) Rueda J., Rotondo M., Ruffini R., Xue S.-S., *The relativistic Feynman-Metropolis-Teller theory for white dwarfs in general relativity*, in PoS PROCEEDINGS of SCIENCE (Texas Symposium 2010, Heidelberg (Germany)), 269.

Ansoldi Stefano

Position: Researcher, University of Udine (Italy)

I Scientific Work

Non-singular solutions of Einstein
Statistical approach to AGN's SEDs fits
Universe creation and Inflation
Dynamics of relativistic shells

II Conferences and educational activities

II a Conferences and Other External Scientific Work

IRAP Ph.D. Erasmus Mundus Workshop "From Nuclei to White Dwarfs and Neutron Stars", April 3-8, 2011 Les Houches (France)

Max Planck Institute for Gravitational Physics (Albert Einstein Institute), Golm, Germany, visiting scientist October 30 – November 6, 2011

II b Diploma thesis supervision

Andrea Gasparin, Physics Undergraduate Thesis, "Sufficient conditions for extrema in variational problems"

II d Other Teaching Duties

General Relativity I, Joint Master in Physics, University of Trieste and Udine, Italy
General Relativity II, Joint Master in Physics, University of Trieste and Udine, Italy

II e. Work With Postdocs

Lorenzo Sindoni, Max Planck Institute for Gravitational Physics (Albert Einstein Institute), Golm, Germany, "Non-singular solutions of Einstein equations"

Nijil Mankuzhiyil, Department of Physics, University of Udine, Italy, "Daily check automation for the MAGIC telescopes" (in progress)

III. Service activities

Member of the PhD board in Mathematics and Physics, University of Udine

Member of the evaluation board of the Fulbright Commission

IV. Other

Member of INFN
Member of the MAGIC collaboration
Member of Mathematical Physics Group GNFM within INDAM

2011 List of Publication

- Mankuzhiyil N., Ansoldi S., Persic M., Tavecchio F. (2011). *The Environment and Distribution of Emitting Electrons as a Function of Source Activity in Markarian 421*, The Astrophysical Journal, vol. **733**; p. 14, ISSN: 0004-637X, doi: 10.1088/0004-637X/733/1/14

- Spallucci E., Ansoldi S. (2011). *Regular black holes in UV self-complete quantum gravity*, Physics Letters, section B, vol. **701**; p. 471, ISSN: 0370-2693, doi: 10.1016/j.physletb.2011.06.005

- Mankuzhiyil N., Ansoldi S., Persic M., Tavecchio F. (sottomesso). *Emitting electrons and source activity in Markarian 501*, The Astrophysical Journal, ISSN: 0004-637X

- Mankuzhiyil N., Ansoldi S., De Caneva G., Persic M., Tavecchio F. (2011) *Emission models and EBL as a tool to measure the redshift of BL Lac objects*, In: Proceedings of the 32nd International Cosmic Ray Conference, **1158 OG2.3**, Beijing, China

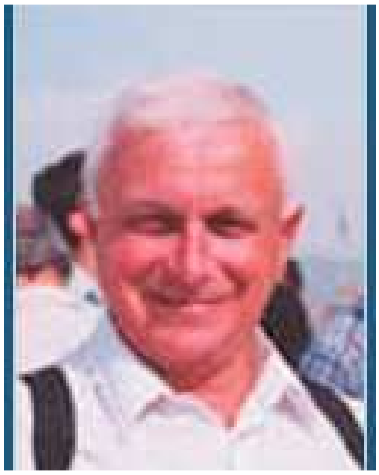
- Mankuzhiyil N., Ansoldi S., Persic M., Tavecchio F. (2011). *The environment and properties of emitting particles in AGN relativistic jets*, In: Proceedings of the 32nd International Cosmic Ray Conference, **1155 OG2.3**, Beijing, China

- Mankuzhiyil N., Ansoldi S., Persic M., Tavecchio F. (sottomesso). *BL Lac Objects: Laboratories to study the environment and properties of emitting particles in relativistic jets*. In: Proceedings of the 2011 Fermi Symposium, Rome, Italy

- Ansoldi S. (2011). *Invited review about the article "On Horava-Lifshitz 'black holes"*. Mathematical Reviews, **MR2660775 (2012a:83024)**, ISSN: 0025-5629

- Ansoldi S. (2011). *Invited review about the article "Applications of elliptic and theta functions to Friedmann-Robertson-Lemaitre-Walker cosmology with cosmological constant"*. Mathematical Reviews, **MR2648365 (2011m:83009)**,ISSN: 0025-5629

Bisnovatyi-Kogan G.S.



2011 List of Publication

1. Active Galactic Nucleus Obscuration through Dusty Infrared-dominated Flows. I. Radiation-hydrodynamics Solution for the Wind
Dorodnitsyn, A.; Bisnovatyi-Kogan, G. S.; Kallman, T.
The Astrophysical Journal, Volume 741, Issue 1, article id. 29 (2011).

2. The Steady State Wind Model for Young Stellar Clusters with an Exponential Stellar Density Distribution
Silich, Sergiy; Bisnovatyi-Kogan, Gennadiy; Tenorio-Tagle, Guillermo; Martinez-Gonzalez, Sergio
eprint arXiv:1110.0847 27 pages, 9 figures,
accepted for publication in the Astrophysical Journal

3. Accretion Disks Around Rotating Black Hole
Klepnev, A.; Bisnovatyi-Kogan, G.
The Second Ferrara Workshop on "X-ray Astrophysics up to 511 keV", held in Ferrara (Italy), September 14 - 16, 2011, article #31.
Published online at http://www.fe.infn.it/astrofe2011

4. Dynamical chaos in the problem of magnetic jet collimation
Bisnovatyi-Kogan, G. S.; Neishtadt, A. I.; Seidov, Z. F.; Tsupko, O. Yu.;
Krivosheyev, Yu. M.
Monthly Notices of the Royal Astronomical Society, Volume 416, Issue 1, pp. 747-756., 2011

5. About the measurements of the hard X-ray background
Bisnovatyi-Kogan, G. S.; Pozanenko, A. S.**:**
Astrophysics and Space Science, Volume 332, Issue 1, pp.57-63, 2011

6. Accretion disks with a large scale magnetic field around black holes, and magnetic jet collimation
Bisnovatyi-Kogan, G. S.; Lovelace, R. V. E.
7 pages, 5 figures, proceedings of the 25th Texas Symposium on Relativistic Astrophysics, held in Heidelberg in December 6-10, 2010, Published online at http://pos.sissa.it/cgi-bin/reader/conf.cgi?confid=123, id.8, 2011
arXiv1104.4866B

Bittencourt Eduardo

Position: PhD student
Period covered: October 19th – November 23rd

I Scientific Work

1. Theoretical Cosmology, in particular, neutrinos cosmology.

2. Theory of the general relativity – the quasi-Maxwellian equations.

3. Nonlinear spinor field theory - effective geometry.

II Conferences and educational activities

1. 8th Friedmann Seminar (Rio de Janeiro).
2. Primeira Reunião Argentino-Brasileira de Cosmologia e Gravitação. (Foz do Iguaçu).
3. Monitor of the Didactical Laboratory (LabDid) at CBPF.

III. Service activities

III a. Within ICRANet: Short term visiting scientist

III b. Outside ICRANet: PhD student at CBPF/Rio de Janeiro

IV. Other

Seminar at Naval College of Angra dos Reis. Title: From Astronomy to Cosmology

2011 List of Publication

Novello, M. ; BITTENCOURT, E., Gaussian coordinate systems for the Kerr metric. G&C. v. 17, p. 230-241, 2011.

Čadež Andrej

Position: full professor (retired Oct. 2011)
Period covered: 2011

I Scientific Work

Delva, Pacôme; Cadez, Andrej; Kostic, Uros; Carloni, Sante	A relativistic and autonomous navigation satellite system
Kostić, U.; Gomboc, A.; Čadež, A.; Calvani, M.	Modelling the light-curves of objects tidally disrupted by a black hole
Delva, Pacôme; Kostić, Uroš; Čadež, Andrej	Numerical modeling of a Global Navigation Satellite System in a general relativistic framework
Zampieri, L.; Germanà, C.; Barbieri, C.; Naletto, G.; Čadež, A.; Capraro, I.; di Paola, A.; Facchinetti, C.; Occhipinti, T.; Ponikvar, D.; and 2 coauthors	The Crab pulsar seen with AquEYE at Asiago Cima Ekar observatory

II Conferences and educational activities

II a Diploma thesis supervision
29diploma

II b Other Teaching Duties
3 master thesis supervision, 8 PhD thesis supervision

III. Other

A.Č. short CV
1971 PhD, disertation Colliding Black Holes. adviser. B. DeWitt
1974/75 post doctoral studies at Observatoire de Paris, Meudon, Fr. and All Souls College, University Observatory, Oxford, U.K.
1975 national prize Boris Kidrič fund award for work in the field of black holes
1980 The article by Smarr, Čadež, DeWitt and Eppley: "Collision of Two Black Holes" reprinted in the selection of black hole defining articles by the Physical society of Japan
1985 president of the national committee for astronomy of SFRJ
1986 LIGO team member at California Institute of Technology
1987 full profesor at the University in Ljubljana,
1987 faculty at California Institute of Technology:
2004-5 Led construction of the 70cm VEGA telescope

teaching experience: Classical Mechanics, Astronomy, Relativity, Astrophysics, Theoretical physics
scientific interests and experimental work:numerical relativity and theoretical tools, gravity experiments, optical pulsar phase photometry, black hole physics
representative publications:

Kuščer, I., Čadež, A.: Entropy production in neutron diffusion. *Physica (Den Haag)*, 1967, 37, 158-164.
Čadež, A.: Apparent horizons in two-black-hole problem. *Ann. phys.*, 1974, **83**, str. 449-457.
Čadež, A: Some remarks on the two-body problem in geometrodynamics. *Ann. phys.*, 1975, **91,** 58-74.
Smarr, L., Čadež, A., DeWitt, B., Eppley, K.: Collision of two black holes : theoretical framework. *Phys. rev. D*, 1976, **14**, str. 2443-2452.
Čadež, A. , Javornik, M.: Free-free opacity in strong magnetic fields. *Astrophys. space sci.*, 1981, 77, 299-318
Čadež, A., Abramovici, A.: Measuring high mechanical quality factors of bodies made of bare insulating materials. *J. Phys. E*, 1988, 21, 453-456
Čadež, A : Internal scattering in Fabry-Pérot cavities. *Phys. rev., A*, 1990, 41, str. 6129-6144
Čadež, A., Galičič, M., Calvani, M.: Do we see free precessing pulsars?. *Astron. astrophys.)*, 1997, **324**, 1005-1009
Fanton, C., Calvani, M., Felice, F. de, Čadež, A.: Detecting accretion disks in active galactic nuclei. *Publ. Astron. Soc. Jpn.*, 1997, **49**, 159-169.
Čadež, A., Fanton, C., Calvani, M: Line emission from accretion disc around black holes : the analytic approach. *New astron. (Gedrukt)*. [Print ed.], 1998, **3**, 647-654
Babič, D., Čadež, A.: Variable geometry two mode levitation trap. *Rev. sci. instrum.*, 1999, 70, 4231-4233
Carraminana, A., Čadež, A., Zwitter, T.: Optical spectrum of main-, inter-, and off-pulse emission from the Crab pulsar. *Astrophys. J.*, 2000, let. 542, **2/ 1,** 974-977
Čadež, A., Carraminana, A., Vidrih, S.: Spectroscopy and three-dimensional imaging of the crab nebula. *Astrophys. J.*,2004, 609, 797-809
Gomboc, A., Čadež, A.: Effects of a Black Hole's Gravitational Field on the Luminosty of a star during a Close Encounter, Ap.J. 2005, **625,** 278-290
Čadež, A., Kostić, U.: Optics in the Schwarzschild spacetime. *Phys. rev., D Part. fields gravit. cosmol.*, 2005, 72, 104024-1-104024-10
Čadež, A.,Calvani M., Kostić, U.: On the tidal evolution of orbits of low-mass satellites around black holes, A&A, 2008, **487**, 527-532
Kostić, U., Čadež A., Calvani, M., Gomboc, A.: Tidal effects on small bodies by massive black holes, A&A 2009, **496**

De Lorenci Vitorio Alberto

Period covered: February 11-26, 2011

I Scientific Work
Cosmology, Gravitation and Quantum Field Theory

II Conferences and educational activities

Conferences and Other External Scientific Work
V. A. De Lorenci, L. G. Gomes, Edisom S. Moreira Jr.
Backreaction effects in the half-space
VIII Friedmann Seminar
Rio de Janeiro, Brazil
May 30 – June 03, 2011

V. A. De Lorenci, R. Klippert, S-Y. Li
Searching cosmological models from phenomenology of large accelerators
VIII Friedmann Seminar
Rio de Janeiro, Brazil
May 30 – June 03, 2011

V. A. De Lorenci, L. G. Gomes, Edisom S. Moreira Jr.
Boundary corrections to thermal averages in a cavity
Encontro de Física 2011
Foz do Iguaçu, Brazil
June 05 – 10, 2011

III Diploma thesis supervision

Title: Trirefringência e a propagação unidirecional em metamateriais não-lineares indefinidos
Student: M.Sc. Jonas Pedro Pereira, August, 2011

2010 List of Publication

V. A. De Lorenci, L. G. Gomes, Edisom S. Moreira Jr.
Gravitational spectral shift caused by Casimir stresses
Physical Review D, vol. 84 (to appear), 2011.

Vitorio A . De Lorenci
Nonsingular and accelerated expanding universe from effective Yang-Mills theory.
Classical and Quantum Gravity, v. 27, p. 065007, 2010.

Vitorio A . De Lorenci, Dante Pereira
Magnetoelectric birefringence as a unique effect in isotropic media.
Physical Review. E, v. 82, p. 036605, 2010.

Kim Jin Young

Position: professor
Period covered: July 1 –July 13

2011 List of Publication

J.Y. Kim and T. Lee, Light bending in a Coulombic field, Mod. Phys. Lett. A 26 (2011) 1481.

J.Y. Kim and T. Lee, Light bending by nonlinear electrodynamics under strong electric and magnetic field, JCAP11(2011)017.

Manreza Paret Daryel

Position: Junior Professor Physics Faculty, Havana University
Period covered: 27-08-2011 / 02-03-2011

I Scientific Work

Currently I am involved in my PhD studies which are about the properties of Fermi gases under strong magnetic fields. We investigate the possible implications of these conditions to astrophysical systems and compute some observables.

II. Service activities

Within ICRANet

As part of my visit to ICRANet I give a short talk entitled: Anisotropic pressures in a Magnetized Fermi Gas. Astrophysical implications.

2010 List of Publication

1) R. González Felipe, D. Manreza Paret and A. Pérez Martínez *Magnetized color flavor locked state and compact stars*, Eur. Phys. J. A (2011) 47: 1 doi: 10.1140/epja/i2011-11001-0.S.

2) D. Manreza Paret, A. Pérez Martinez, A. Ulacia Rey and R. A. Sussman, "Dynamics of a self-gravitating neutron source", JCAP03 (2010) 017 doi: 10.1088/1475-7516/2010/03/017.

3) A. P. Martinez, R. G.Felipe and D. M. Paret, *Mass-radius relation for magnetized strange quark stars*, International Journal of Modern Physics D Vol. 19, Nos. 8-10 (2010) 1511-1519, DOI: 10.1142/S0218271810017378, arXiv:1001.4038 [astro-ph.HE].

Park Myeong-Gu

Position: Professor, Kyungpook National University, KOREA
Period covered: 1 July – 10 July

I Scientific Work

1. Microlensing
2. Relativistic radiation hydrodynamics
3. Accretion physics

II Conferences and educational activities

1. The 12th Italian-Korean Symposium for Relativistic Astrophysics, Pescara, 4 July 2011 ~ 8 July 2011.

2011 List of Publication

1. B.-C. Lee, D. E. Mkrtichian, I. Han, K.-M. Kim, M.-G. Park, A Likely Exoplanet Orbiting the Oscillating K-giant α Arietis, Astronomy & Astrophysics 529:A134/1-6 (2011.05)
2. Yoon-Hyun Ryu, Heon-Young Chang, Myeong-Gu Park, Detection Probability of a Low-Mass Planet for Triple Lens Events: Implication of Properties of Binary-Lens Superposition, Monthly Notices of the Royal Astronomical Society 412(1):503-510 (2011.03.20)

Pinto-Neto Nelson

Position: Visitor Professor
Period covered: 24/10/2011 until 08/11/2011

I Scientific Work

Physical scenarios where bouncing cosmological models can be realized, especially the ones connected with quantum effects in the primordial Universe. Then we study the evolution of linear cosmological perturbations in these scenarios, and their consequences for structure formation and in the anisotropies of the cosmic background radiation, seeking for possible observational consequences of a primordial contracting phase preceding the present expansion phase. These formulations require non standard quantum theories, which are also investigated and requires a deep understanding of the foundations of quantum mechanics.

II Conferences and educational activities

II a Conferences and Other External Scientific Work

1-Friedmann Seminar, Rio de Janeiro, Brazil.
2-Brazilian Meeting in Physics, Foz do Iguaçu, Brazil.
3-I Argentinian-Brazilian Meeting on Astrophysics and Cosmology, Foz do Iguaçu, Brazil.
4-Scientific visit to the Clemson University, Clemson, USA, to collaborate with Anthony Valentini.
5-Seminar talk in La Sapienza, Rome.

II b Work With Students

1-Grasiele Santos: Quantum-to-classical transition of cosmological perturbations.
2-Diego Pantoja: Future singularities.
3-Clecio de Bom: Quantum cosmology.
4-Stella Pereira: Bouncing models and the cosmological Constant.

II c Diploma thesis supervision

1-Rafael Perez: Inhomogeneous inflation.
2-Sandro Vitenti: Cosmological perturbations in bouncing models.

II d Other Teaching Duties

1-Quantum theories and interpretations: CBPF graduate course.
2-Quantum mechanics: CBPF graduate course.

II e. Work With Postdocs

1-Beatriz Siffert: Gravitational waves in bouncing models.
2-Rodrigo Maier: Bouncing models and dark energy.

III. Service activities

Outside ICRANet

Coordinator of the ICRA department in CBPF

2011 List of Publication

1) Spherically Symmetric Inflation, with Rafael Perez, in Gravitation and Cosmology.
2) Bouncing models and quantum theory, in International Journal of Modern Physics A.

Qadir Asghar

Position: Professor

I Scientific Work: Attached file.

II Conferences and educational activities

II a Conferences and Other External Scientific Work
Incomplete list given in Va and Vb of my CV
II b Work With Students It is difficult to say. Roughly half of the papers are with my students.
II c Diploma thesis supervision List given in VII of my CV
II d Other Teaching Duties List given in VI of my CV
II e. Work With Postdocs We hardly have had any postdocs at QAU or CAMP. Of the two, one wrote a paper with me. However, many faculty have worked with me like postdocs.

III. Service activities

III a. Within ICRANet It is not clear to me that I have any as such. However, I did organize the **Second Joint Italian Pakistani Workshop on Relativistic Astrophysics at ICRA, Pescara** and the proceedings of that Workshop were published as a special issue of *General Relativity & Gravitation*.
III b. Outside ICRANet Incomplete list given in XI of my CV. Much more done that has no longer been recorded.

IV. Other See CV attached for various incomplete lists.

2011 List of Publications

1. "Some extensions of the Fermi-Dirac and Bose-Einstein functions with applications to the family of the zeta and related functions" by H.M. Srivastava, M.A. Chaudhry, **A. Qadir** and A. Tassaddiq, Russian J. Math. Phys. **18** (2011) 107 - 121.

2. "Estimating the parameters of the Sgr A* black hole", F. De Paolis, G. Ingrosso, A. A. Nucita, **A. Qadir** and A. F. Zakharov, Gen. Rel. & Gravit. **43** (2011) 977 – 988.

3. "Primordial black holes in phantom cosmology", M. Jamil and **A. Qadir**, Gen. Rel. & Gravit. April **43** (2011) 1069 - 1082.

4. "Fourier transform and distributional representation of the generalized gamma function with some applications", A. Tassaddiq and **A. Qadir**, Applied Mathematics and Computation **218** (2011) 1084 – 1088.

5. "Inequivalence of classes of linearizable systems of second order ordinary differential equations obtained by real and complex symmetry analysis", S. Ali, **A. Qadir**, M. Safdar, Mathematical and Computational Applications **16** (2011) 923 – 934.

6. "Classification of ordinary differential equations by conditional linearizability and symmetry", F.M. Mahomed and **A. Qadir,** Communications in Nonlinear Science and Numerical Simulation **17** (2011) 573 - 584.

7. "Possible detection of the M31 rotation in WMAP data", F. De Paolis, V. G. Gurzadyan, G. Ingrosso, Ph. Jetzer, A. A. Nucita, **A. Qadir**, D. Vetrugno, A. L. Kashin, H. G. Khachatryan, and S. Mirzoyan, Astron. & Astrophys. **534** (2011) L8, 1 – 5.

8. "Fourier transform representation of the extended Fermi-Dirac and Bose-Einstein functions with applications to the family of the zeta and related functions", A. Tassaddiq, **A. Qadir**, Integral Transforms and Special Functions (2011) DOI 10.1080/10652469.2011.561002.

9. "A new generalization of the Riemann zeta function and its difference equation", M.A. Chaudhry, **A. Qadir** and A. Tassaddiq, Advances in Differential Equations **20** (2011) 13 pages.

10. "Linearizability of systems of ordinary differential equations obtained by complex symmetry analysis", by M. Safdar, **A. Qadir** and S. Ali, Mathematical Problems in Engineering **10.1155** (2011) 171834, 17 pages.

Tarasenko Alexander

Position: PhD student of the Belarusian State University
Period covered: 21.03.2011 – 09.04.2011

Conferences and educational activities

II a Conferences and Other External Scientific Work:

I participated in 2 scientific workshops:

1. "Recent News from the GeV and TeV Gamma-Ray Domains", Pescara, March 21-26, 2011.
2. "From Nuclei to White Dwarfs and Neutron Stars", Les Houches, April 3-8, 2011.

2010 List of Publication

1. A. Tarasenko, Reconstruction of a compact object motion in the vicinity of a black hole by its electromagnetic radiation, Phys Rev D, Vol. 81 (2010), p. 123005.

2. A. Tarasenko and A. Gorbatsievich, Green's function approach to the calculation of the gravitational radiation of a particle radially moving in the Schwarzschild space-time, Proceedings of the National Academy of Sciences of Belarus, Series of Physical-Mathematical Sciences, No 1 (2010), pp. 80-85.

Torres Sergio

Positions:

- Researcher, Centro Internacional de Física, Bogotá, Colombia
- Systems Engineer, IS&GS, Washington D.C., USA

Period covered: 2011

I Scientific Work

- Cosmology, test of cosmological models using cosmic background radiation data from COBE, WMAP and Planck missions

II Conferences and educational activities

II a Conferences and Other External Scientific Work

1 - Astrophysics and Cosmology Workshop – Andes University (Colombia), May 2011
Introduction to CMB data analysis, identification of available databases and research projects for students
2 – 'Hands-on Astronomy' project in Colombia: installed/coordinated initial phase. Workshop for participants (educators and researchers) planned for 2012.

2011 List of Publication

Book: "El Big Bang: aproximación al universo y a la sociedad", Siglo del Hombre Editores, Bogotá, 2011

Yang Jongmann

Position: Professor
Period covered: 1985-present

I Scientific Work
Big bang nucleosynthesis, cosmic ray, isotope

II Conferences and educational activities
Conferences and Other External Scientific Work
The 12th Italian-Korean Symposium on Relativistic Astrophysics, July 4-7, 2011

2010 List of Publication

F. Kajino et al.(JEM-EUSO Collab.)
The JEM-EUSO mission to explore the extreme universe
Nucl. Instrum. Meth. A 623, 422-424 (2010)

A.A. Isayev and J. Yang
Finite temperature effects on spin polarization of neutron matter in a strong magnetic field
J. Korean Astron. Soc. 43, 161-168 (2010)

H.S. Ahn et al.(CREAM Collab.)
Measurements of the relative abundances of high-energy cosmic-ray nuclei in the TeV/nucleon region
Astrophys. J. 715, 1400-1407(2010)

H.S. Ahn et al.(CREAM Collab.)
Discrepant hardening observed in cosmic-ray elemental spectra
Astrophys. J. Lett. 714, L89-L93(2010)

A.A. Isayev and J. Yang
Phase transition to the state with nonzero average helicity in dense neutron matter
JETP Lett. 92, 867-871(2010)

M. Aguilar et al.(AMS Collab.)
Relative composition and energy spectra of light nuclei in cosmic rays: Results from AMS-01
Ap. J. 724, 329-340(2010)

A.A. Isayev and J. Yang
Spin ordered phase transitions in neutron matter under the presence of a strong magnetic field
Probl. Atom. Sci. Tech. 55, 3-9(2011)

Y.S. Yoon et al.(CREAM Collab.)
Cosmic-ray proton and helium spectra from the first CREAM flight
Ap. J. 728, 122-129(2011)

D. Ikeda et al. (TA collab.)
Results from the Telescope Array experiment
Astrophys. Space Sci. Trans. 7, 257-263 (2011)

497. J.N. Matthews et al. (TA collab.)
First results from the Telescope Array
Nucl. Phys. B Proc. Suppl. 212-213, 79-86(2011)

Bavarsad Ehsan

Position: Ph.D student at Isfahan University of Technology (IUT) Iran.
Visiting scholar ICRANet.
Period covered: February 9th 2011 to July 27th 2011.

I Scientific Work

Since 2007, I have been working on electroweak processes in a background magnetic fields. Especially I work on, generation of circular polarization of the cosmic microwave background (CMB) due to background magnetic fields, effects of magnetic field on emission of neutrinos from neutron stars, high-energy neutrino emission in gravitational collapses and neutrino oscillations. When stayed at ICRANet, I collaborated with Prof. Xue and we worked on high-energy neutrino emission in gravitational collapses.

II Conferences and educational activities

II a Conferences and Other External Scientific Work

(i) 12th Italian-Korean symposium on relativistic astrophysics, 4-8 July 2011, Pescara, Italy (ICRANet).
(ii) Recent news from the Mev, GeV and TeV Gamma-Ray domains: results and interpretations, 21-26 March 2011, Pescara, Italy (ICRANet).

2011 List of Publication

E. Bavarsad, R. Ruffini, S. S. Xue, `` *High-energy neutrino emission in gravitational collapses,''* in progress.

Long Hoang Ngoc

Position: Head of Particle Physics section, Graduate School, Institute of Physics Vietnamese Academy of Science and Technology

Period covered: From 2000 --- now

I. Scientific Work

1. Non-thermal leptogenesis in supersymmetric 3-3-1 model with inflationary scenario, D. T. Huong and H**. N. Long**, [arXiv:1004.1246(hep-ph)], *J. Phys. G*: Nucl. Part. Phys. **38** (2011) 015202 (17 pages).

2. The 3-3-1 model with *S_4* flavor symmetry, P. V. Dong, **H. N. Long**, D. V. Soa, and V. V. Vien, [arXiv:1009.2328(hep-ph)], *Eur. Phys. J.* **C 71** (2011) 1544 (11 pages).

4. Photon-radion conversion cross-sections in external electromagnetic field, P. V. Dong**, H. N. Long,** D. V. Soa and N. H. Thao: [arXiv:1110.2276(hep-ph)] (2011), *J. High Energy Phys*. **10** (2011) 018 (17 pages).

5. Probing Dark Matter in the Economical 3-3-1 Model, D. T. Huong, C. S. Kim, **H. N. Long** and N. T. Thuy, [arXiv:1110.1482(hep-ph)] (2011), submitted to JHEP.

II. Conferences and educational activities

II a. Conferences and Other External Scientific Works:
I) I am member of Scientific committee of the National Foundation for Science Technology Development (NAFOSTED) of Vietnam
2) Lead Guest Editor of Special Issue on Non-Abelian Gauge Symmetries Beyond the Standard Model, journal: Advances in High Energy Physics (AHEP)
3) Editor of journal of Vietanm: Communications in Physics.

II b. Work With Students: I give lectures on Quantum Field Theory for Undergraduate students, Hanoi University of Education, Standard Model for Graduate students, Can Tho University

II c. Diploma thesis supervision: I am supervisor for 3 Ph. D. students and 3 Master Students.

II d. Other Teaching Duties: I am a referee for some Ph. D. Theses.

II e. Work With Postdocs: Now I work with Postdoc: P. V. Dong, D. T. Huong

III. Service activities
III a. Within ICRANet: I hope to visit ICRANET next year 2012.

IV. Other I am referee for some International Journal such as: Phys. Rev. D, Europhysics Letters,…

Mohammadi Rohoollah

PhD. in High Energy Physics
Graduated from Department of Physics,
Isfahan University of Technology, Iran
Position: Collaboration with ICRANet as Researcher,
Scientific Work: High Energy Physics and Astrophysics

Conferences and educational activities

Academic background:

- 1999-2003: B.Sc in physics in Tarbieat-e-Moallem university, Karaj, Iran.
- 2003-2005: M.Sc.in high energy physics in Tehran University, Tehran, Iran. Thesis title: Study of structure function of neutron in the impulse approximation.
- 2005-2010: PhD in high energy physics in Isfahan University of Technology, Isfahan, Iran. Thesis title: The interactions of elementary particles
- in background magnetic field.

Courses passed in PhD:

- Field theory (main references: Introduction with field theory by Peskin).
- Introduction with supersymmetry (specially MSSM)
- Introduction with standard model and grand unified theory (GUT).
- Introduction with neutrino physics (main references: Massive neutrinos in Physics and Astrophysics by R. N. Mohapatra and Palash B. Pal).
- Fairly good introduction with numerical calculations (FORTRAN programming).

Participation in international conferences:

- Summer school on particle physics, 15 June- 15 July 2009, the Abdus Salam International Centre for Theoretical Physics, Trieste, Italy.
- School of particles and Accelerators (IPM),Isfahan, Iran (2009).
- Collaboration with ICRANet as visitor, March-August 2010, Pescara, Italy.
- Second Galileo-XuGuangqi meeting 11-16 July 2010, Ventimiglia- Italy
- A few international conferences held in Iran.

Other Teaching Duties:

Teaching in Department of Physics, Isfahan University of Technology, Iran (2005-2010)

Service activities

Within ICRANet:

- Collaboration with ICRANet as visitor, March-August 2010, Pescara, Italy.

2010 List of Publication

1. *M. M. Etefaghi, M. Hagheghat, R. Mohammadi, "Noncommutative QED+QCD andcorresponding beta-function", Phys. Rev. D 82, 105017 (2010).*

2. *E. Bavarsad, M. Hagheghat and R. Mohammadi, "Generation of circular polarization of theCMB", Phys. Rev. D , 084035 (2010).*

3. *E. Bavarsad, M. Hagheghat and R. Mohammadi, "Necleon-Necleon scattering in back groundmagnetic field" , Phys. Rev. D 82, 105015 (2010)*

4. *Mohammadi R., Remo Ruffini and She-Sheng Xue, "Neutron stars in the presence of the strongmagnetic Field", (Presented in 2th Galileo-XuGuangqi meeting 11-16 July 2010, Ventimiglia-Italy)*

5. *Mohammadi R., Remo Ruffini and She-Sheng Xue, "The solution of Thomas-Fermi equation in the presence of the strong magnetic Field", (Presented in 25th Symposium on Relativistic Astrophysics Texas , 6-10 Dec 2010, Heidelberg, Germany)*

Motie Iman

Position:
Ph.D Student -Isfahan University of technology -Iran (from 2008)
Visiting Scholar- ICTANet (2010/11)

I. Scientific Work

At this moment I am especially interested in:

1- Neutrino physics and connection of neutrino physics with neutron star and cosmology.

2- Polarization of the Cosmic Microwave Background (CMBp).

3- Theories of the beyond the standard model (SM), such as SME (Lorentz invariant violation), Graund Unified Theory (GUT), the theory of left-right symmetry and non-commutative quantum field theory.

For this purposes, with cooperation by Prof. Xue, a few months ago, we have computed an effective lagrangian in SM framework, and by using of this lagrangian we studied neutrino oscillation pattern in neutron star. Besides, very high energy neutrino, which can generate by GRB (gamma ray brust) or AGN (active galactic nucleus), are very useful probe for investigation about Lorentz Invariant Violation (LIV). we are researching in this field and we had good progresses.

In another study, we have shown that the magnetic field via Euler-Heisenberg lagrangian can generate the circular polarization of the CMB when CMB propagate to us.

My another activity is, computation of Muon g-factor. There is a difference between calculations of the SM as an effective theory, and the experimental results. By using the SME lagrangian, I find that LIV effects supply this difference and this subject can be important for researching about LIV.

II. Conferences and educational activities

a. Conferences and Other External Scientific Work

(i) 5th Meeting of the Scientific Committee of ICRANet. December 14-15, 2010.
(ii) 2nd conference on physics particles and fields. Semnan- Iran. November, 2011.

b. Other Teaching Duties

Taught courses on Especial Relativity, Electromagnetism, Mechanics,.

2011 List of Publication

(i) Euler-Heisenberg Lagrangian and photon circular polarization, Iman Motie and She-Sheng Xue, [arXiv: hep-ph 1104.3555]

(ii) Neutrino oscillations in nuclear media, Iman Motie and She-Sheng Xue, [arXiv: hep-ph 1104.2837]

(iii) Muon g-factor in SME, Iman Motie and Mansour Haghighat (In preparation)

Arguelles Carlos Raúl

Position: Dottorando (Astrofisica Relativistica, IRAP-PHD 26° ciclo)
Period covered: 2010/2011

I Scientific Work

My scientific activities are related with numerical computational work based in theoretical models and also purely theoretical physics, in the following research areas (within ICRANet): Dark Matter, General Relativity applied to compact objects (the problem of matching exterior and interior solutions) and nuclear physics for compressed atoms (Relativistic Feynman-Metropolis-Teller theory at finite temperature). I also have some experience in other research areas (within IFLP- Argentina) : quantum gravity (Horava Theory) and string theory (collaborator member on Ads/CFT research group, La Plata).

II Conferences and educational activities

II a Conferences and Other External Scientific Work

I have attended at the following coferences, schools and meetings

- 2011 Fermi Symposium, May 9-12, 2011, Rome (ITALY)
- 12th Italian-Korean Symposium on Relativistic Astrophysics, July 4-8, 2011, ICRANet, Pescara (ITALY).
- IRAP Ph.D Erasmus Mundus School, September 5-16, 2011, Nice (FRANCE)
- Third Galileo- Xu Guangqi Meeting, October 11-15, 2011, Beijing (CHINA)

II b Work With Students

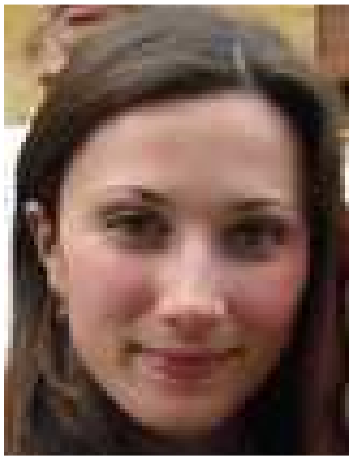
I have made some works in collaboration with students within ICRANet,

- Self-Gravitating System of fermions as central objects and dark matter halos in Galaxies, Bernardo Fraga, Carlos R. Arguelles, Remo Ruffini; talk given at 3rd Galileo Xu.Guangqi Meeting, October 14, 2011, Beijing.

- The relativistic Feynman-Metropolis-Teller Theory at zero and finite temperature, Sheyse Martins de Carvalho, Carlos R. Arguelles, Jorge A. Rueda, Remo Ruffini; poster presented in the 3rd Galileo Xu.Guangqi Meeting, October 14, 2011, Beijing.

- *Semidegenerated self-gravitating system of fermions as a model for dark matter halos and universality laws,* Carlos R. Arguelles, Bernardo Fraga ,Remo Ruffini; article in preparation.

Benetti Micol



Position: Ph..D Student, IX IRAP
Period covered: from November 1st 2010 to 31 October 2011

Scientific Work

In the last year, I worked on updating the constraints on possible features in the primordial inflationary density perturbation spectrum using the latest data from WMAP7 and ACT Cosmic Microwave Background experiments. Non-standard large scale features are allowed by data and it is possible to generate them in a cosmological way introducing a sharp step in the inflation potential. Using cosmological data we derived constraints on the position, magnitude and gradient of a possible step; the inclusion of new data significantly improves the constraints respect to older work, especially to smaller angular scales. While we found no clear statistical evidence in the data for extensions to the simplest inflationary model, models with a step provide a significantly better fit than standard featureless power-law spectra.
We have also studied how that step in the inflationary potential could be verified using forthcoming temperature and polarization data from the Planck satellite mission. The results of this work have been published in an international peer-rewieved journal [Benetti et al., Phys. Rev. D 84, 063509].
At the moment, I am updating this analysis using the more recent data from the South Pole Telescope.

Conferences and educational activities

- Talk on *The third Galileo- Xu Guangqi meeting* about *New constraints on features in the primordial spectrum* – October 2011, Beijing, China

- Attended the following Ph.d schools:
  - *Azores school on observational Cosmology* – September 2011, Angra do Heroismo, Azores, Portugal
  - *Sciences Fondamentales et Appliques* - Erasmus Mundus School, May 2011 Nizza, France
  - *Neutrinos in Cosmology* – INFN Formation School, May 2011, Padova, Italy
  - *Dark Energy probes - Dynamical evolution of globular clusters* – May 2011, Bertinoro, Italy

- Attended in *From Nuclei to white Dwarfs and Neutron Stars* - IRAP Ph.D Erasmus Mundus Workshop, April 2011, Les Houches, France

Service activities

Within ICRANet

- Work with Massimiliano Lattanzi on the results published in *Phys. Rev. D 84, 063509* . We update the constraints on the features in the primordial spectrum using the latest data from WMAP7 and ACT.
- Working with Stefania Pandolfi on the improvement of the previous analysis using the more recent data from SPT.

Outside ICRANet:

- Junior Specialist for the Department of Physics and Astronomy at the University of California, Irvine, from June to July 2011.
  Advisor: Dr. Asantha Cooray, Professor in the Department of Physics and Astronomy.

Research project*: Cosmological constraints using 21 cm radiation from epoch of Reionization*.

- Member of Euclid Collaboration, Science Programme European Space Agency.

2011 List of Publications

Features in the primordial spectrum: new constraints from WMAP7+ACT data and prospects for Plank. M. Benetti, M. Lattanzi, E. Calabrese, A. Melchiorri, Phys. Rev. D 84, 063509 (9 September 2011)

Boshkayev Kuantay

Position: third year IRAP student (Eighth Cycle)
Period covered: 2010/2011 academic year

I Scientific Work

I work on the following topics: exact and approximate solutions; geodesics in the Hartle-Thorne spacetime; rotating white dwarfs; nuclear matter cores of stellar dimensions.

II Conferences and educational activities

II a Conferences and Other External Scientific Work

- 25th Texas Symposium on Relativistic Astrophysics . *December 6-10, 2010. Heidelberg, Germany*
- IRAP Ph.D. Erasmus Mundus Workshop. *March 21-26, 2011 Pescara (Italy). Recent News from the Mev, GeV and TeV Gamma-Ray Domains*
- IRAP Ph.D. Erasmus Mundus Workshop. *April 3-8, 2011 Les Houches (France). From Nuclei to White Dwarfs and Neutron Stars*
- First Caribbean Symposium on Nuclear and Astroparticle Physics - STARS2011. *1-4 May 2011 La Habana, Cuba.*
- IRAP Ph.D. Erasmus Mundus school. *May 25th - June 10th, 2011 (Nice, France)*
- Advances in Computational Astrophysics: methods, tools and outcomes. *June 13-17, 2011 Cefalù (Sicily, Italy).*
- 12th Italian-Korean Symposium on Relativistic Astrophysics. *July 4-8, 2011. ICRANet, Pescara (ITALY)*
- IRAP Ph.D. Erasmus Mundus school. *September 5th - 16th, 2011 (Nice, France).*
- Third Galileo - Xu Guangqi meeting. *October 11-15, 2011. National Astronomical Observatories - Beijing (China).* THE SUN, THE STARS, THE UNIVERSE and GENERAL RELATIVITY

III. Service activities

III a. Within ICRANet (Talks and lectures)

- Talk entitled: "Minimum Period of Rotating White Dwarfs in General Relativity" was given at IRAP Ph.D. Erasmus Mundus Workshop. *March 21-26, 2011 Pescara (Italy). Recent News from the Mev, GeV and TeV Gamma-Ray Domains*
- Talk entitled: "Minimum Period and Maximum Mass of Rotating White Dwarfs" was given at IRAP Ph.D. Erasmus Mundus Workshop. *April 3-8, 2011 Les Houches (France). From Nuclei to White Dwarfs and Neutron Stars*
- Lecture entitled: "On the Minimum Period Rotating White Dwarfs" was delivered at IRAP Ph.D. Erasmus Mundus school. *May 25th - June 10th, 2011 (Nice, France).*
- Talk entitled: "Equatorial and circular geodesics in the Hartle-Thorne spacetime" was given at 12th Italian-Korean Symposium on Relativistic Astrophysics. *July 4-8, 2011. ICRANet, Pescara (ITALY)*
- Lecture entitled: "Non-rotating and Rotating White Dwarfs" was delivered at IRAP Ph.D. Erasmus Mundus school. *September 5th - 16th, 2011, (Nice, France).*
- Talk entitled: "Critical masses of rotating white dwarfs" was given at Third Galileo - Xu Guangqi meeting. *October 11-15, 2011. National Astronomical Observatories - Beijing (China).*

III b. Outside ICRANet (Posters)

- Poster entitled: "On the Stability of Rotating Nuclear Matter Cores of Stellar Dimensions" was presented at 25th Texas Symposium on Relativistic Astrophysics . *December 6-10, 2010. Heidelberg, Germany*
- Poster entitled: "On the Maximum Mass of General Relativistic Uniformly Rotating White Dwarfs" was presented at First Caribbean Symposium on Nuclear and Astroparticle Physics - STARS2011. *1-4 May 2011 La Habana, Cuba.*
- Poster entitled: "On Nuclear Matter Cores and Their Applications" was presented at Advances in Computational Astrophysics: methods, tools and outcomes. *June 13-17, 2011 Cefalù (Sicily, Italy).*

Topics of scientific works and collaborators:

- Geodesics in the Hartle-Thorne Spacetime in collaboration with Donato Bini, Remo Ruffini and Ivan Siutsou;
- Rotating White Dwarfs in collaboration with Jorge Rueda, Remo Ruffini and Ivan Siutsou;
- Nuclear Matter Core of Stellar Dimensions in collaboration with Michael Rotondo and Remo Ruffini;
- Exact and Approximate Solutions in collaboration with Hernando Quevedo and Remo Ruffini.

2011 List of Publication

K. Boshkayev, J. Rueda and R. Ruffini. On the Maximum Mass of General Relativistic Uniformly Rotating White Dwarfs. Submitted to International Journal of Modern Physics E. 2011

K. Boshkayev, M. Rotondo and R. Ruffini. On Nuclear Matter Cores and Their Applications. Submitted to the Astronomical Society of the Pacific Conference Series. 2011

Bravetti Alessandro

Position: Ph.D. student
Period covered: 1st november 2009 to now

I Scientific Work
Inverse Scattering Method
Geometrothermodynamics

II Conferences and educational activities
II a Irap Ph.D. Courses in Nice, february 2010
II b Irap Ph.D. Courses in Nice, september 2010

Han Wenbiao

Position: IRAP Ph.d
Period covered: 2010.11.1-2011.10.31

I Scientific Work

1. Gravitational waves from intermediate mass-ratio inspirals;
2. Electron-positron pair production and electronic energy radiation during gravitational collapse

II Conferences and educational activities

II a Conferences and Other External Scientific Work

1. Recent News from the Mev, GeV and TeV Gamma-Ray Domains, Pescara, March 21-26, oral talk;

2. From nuclei to white dwarfs and neutron stars, April 3-8, 2011 - Les Houches (France) , oral talk;

3. The 12th Italy-Korea Symposium, Pescara, July 4-8, oral talk;

4. The 3rd Galileo-Xu Guangqi meeting, Beijing, Oct. 12-16, oral talk

2011 List of Publication

1. On the frequencies of oscillations in pair plasma generated by a strong electronic field, A. Benedetti, W-B. Han, R. Ruffini and G.V. Vereshchagin, Physical Letters B 698: 75-79 (2011)

2. Constructing EOB dynamics with numerical energy flux for intermediate mass-ratio inspirals, W-B Han and Z. Cao, Physical Review D84: 044014 (2011)

3. Electron and positron pair production in gravitational collapse , W-B Han, R. Ruffini and S-S Xue, submitted to Physical Review Letters , arXiv:1110.0700 (2011)

Luongo Orlando

Position: PhD student
Period covered: November 2010 - November 2011

I Scientific Work

1) Geometrothermodynamics
2) Observational cosmology
3) Compact objects (naked singularities)

II Conferences and educational activities

II a Conferences and Other External Scientific Work

Cosmology on the beach, Puerto Vallarta, Mexico
Seminar at the institute of nuclear sciences, UNAM, Mexico

II b Work With Students

Lorena Campuzano (UNAM, Mexico)

2011 List of Publication

O. Luongo, Mod. Phys. Lett. A, 26, 20, 1459-1466, (2011).
O. Luongo, H. Quevedo, to appear in Astroph. and Sp. Sci., (2011).
A. Avilès, L. Bonanno, O. Luongo, H. Quevedo, Phys. Rev. D, 84, 103520, (2011).
O. Luongo, H. Quevedo, submitted to Phys. Lett. A, Arxiv:1104.4758, (2011).
G. Iannone, O. Luongo, Europh. Lett., 94, 49002, (2011).

Menegoni Eloisa

Position: Ph. D student (VIII-IRAP)
Period covered: from November 1 2009 to 31 October 2012

I Scientific Work

Constraints on Physics fundamental constants from CMB data

In about four refereed papers, I investigated the value of nature's fundamental couplings in the early universe, considering possible deviations from the current standard values. A time varying fine structure constant can leave an imprint on CMB anisotropies by changing the time of recombination and the size of the acoustic horizon at photon-electron decoupling.

The CMB datasets have been extensively used to constrain the fine structure constant by parametraizing a variation in the fine structure constant as $\Delta\alpha = (\alpha - \alpha\_0)/\alpha\_0$, where

$\alpha\_0 = 1/137.03599907$ is the standard value and is the value during the recombination process.

In my first work I performed a Monte Carlo Markov of Chain analysis using WMAP-5 years data. The constraints are much tighter if you also include all the CMB data plus a prior on the value of Hubble constant.

The interesting point is that the CMB is an observable potentially sensitive to variations in both fundamental constants: the fine structure constant and G. It is therefore interesting to perform a combined analysis of CMB data considering simultaneous variations in α and G in order to investigate the possible correlations and deviations from the standard values. Specifically, the most models consider that the variations of α and G are related by $\Delta\alpha / \alpha = Q(\Delta G/G)$ with Q a free parameter that can be positive or negative, but not much larger than unity in absolute value $(-10 < Q < 10)$.

I considered variations in the Newton's constant G by introducing a new dimensionless parameter λ_G, this model is like a scaling in the value of Newton's constant $G \rightarrow (\lambda\_{G})^{2}G$. In my paper I perfomed an analysis by allowing also variations on the value of fine structure constant as a dimensionless parameter.

The presence of a scalar field at Recombination could induce variations in the fine structure constant. Searching for relations in the variations of the fine structure constant and a non-negligible scalar field at recombination, it is possible to describe the scalar field with a Early Dark Energy (EDE) model where the dark energy density parameter and equation of state are parametrized in the way to be coupled. As expected the magnitude of the variation is controlled by the strength of the coupling. I modified the CAMB code for early dark energy including the variations of the fine structure (see published papers).

Planck Data Analysis: assessment and control of aliasing

Since the beginning of my PhD I have been involved in the Planck satellite working on cosmology oriented data analysis. CMB anisotropies and their polarized component can be used to constrain cosmological models. Planck is the most sensitive experiment ever built to this purpose. At the level of accuracy allowed by Planck, tight control of the sources systematic errors, arising from the sky, the instrument and the data analysis procedures becomes extremely relevant. My research activity for Planck deals with controlling the latter effects in the context of Planck CMB likelihood analysis.

While Planck is a high resolution experiment, its full sky maps containing tens of million of pixels, analysis of the dataset at reduced resolution is also extremely important. In fact, it is computationally unfeasible to characterize the large angle CMB cross correlations directly at high resolution. Maps need to be degraded first, in order to analyze them at reduced resolution.

This degradation process does not come without a price, as it is potentially capable of inducing artifacts in the data. In particular, I have been involved in a study the so-called aliasing effects that arise when a signal is sampled at a spatial frequency coarser than what its bandwidth would allow. The resulting bias could jeopardize the use of Planck data to constrain cosmological models. It is therefore of primary importance to keep such artifacts under control, researching and implementing the appropriate anti-aliasing procedures. Angular power spectrum analysis is the appropriate tool to assess the presence of aliasing and the effectiveness of the procedures. I have been using the tool BolPol to this extent.

II Conferences and educational activities

II a Conferences and Other External Scientific Work

1) 'VIII Mexican School of the Gravitation and Mathematical Physics Division of the Mexican Physical Society:<Speakable and Unspeakable in Gravitational Physics> "', held in Playa del Carmen, Mèxico, 6-12 December 2009.

2)"`Cosmology on the Beach: Essential Cosmology for the Next Generation"' organized by Berkeley Center for Cosmological Physics (USA) and Istituto Avanzado de Cosmologìa (México)

-Playa del Carmen., México, January 11-15,2010.

3)"`IRAP Ph.D Lectures"' \, Nice Observatoire de la Cote d'Azur, Nice, France, February 1-5, 2010.

4)"`X-/gamma-ray observational astrophysics and prospects"', IRAP School in Ferrara, Italy, March 23-24, 2010.

5) "'5 Iberian Cosmology Meeting"'\, in Porto, Portugal, from 29 to 31 of March,2010,

and organized by the "`Centro de Astrofisica da Universidade do Porto"'.

6) "'HORIBA INTERNATIONAL CONFERENCE COSMO/CosPA2010"'\, at the University of Tokyo, Japan, from 27 of September to 1 of October,2010.

7) "Miami2010: A topical conference on elementary particles, astrophysics, and cosmology"' held in Fort Lauderdale (FL), USA, from 14 to 19th of December, 2010.

8) "Planck:LFI-Core Team"' held in Bolognue, Italy, from 17th to 18th of January, 2011.

9) "Planck:LFI-Core Team"' held in Pasadena, California (USA), from 14th to 18th of February, 2011.

10) "Planck:LFI-Core Team"' held in Bolognue, Italy, from 7th to 10th of March, 2011.

11) "IRAP Ph.D and Erasmus mundus workshop: Recent News from the Mev, GeV and TeV Gamma-Ray Domains"' held in Pescara, Italy, from 21th to 26th of March, 2011.

12) "IRAP Ph.D and Erasmus Mundus workshop:From Nuclei to White Dwarfs and Neutron Stars"' held in Les Houches, France, from 3th to 8th of April, 2011.

13) "'Planck Joint Core Team meeting"' held in Paris at the Laboratoire de l'Accélérateur Linéaire Orsay , France, from 2th to 4th of May, 2011.

14) "'School of Astrophysics 'Francesco Lucchin', XI Cycle, III Course"' held in Bertinoro, Italy, from 8th to 13th of May, 2011.

15) "Azores School on Observational Cosmology"', held in Angra do Heroìsmo, Azores, Portugal from $1th-5th$ of September, 2011.

16) "Erasmus mundus-IRAP PhD Lectures Universite de Nice Sophia Antipolis"', held in Nice, France, from 13th-15th of September, 2011.

17) "`3rd Galileo-Xu GuangQi Meeting,"', held at National Astronomical Observatory of the Chinese Academy of Sciences, in Beijing, China, from 11th-15th of October, 2011.

III. Service activities:

Junior Specialist for the Department of Physics and Astronomy at the University of California, Irvine, from June 21 to September 20, 2010 in collabortion with Dr. Asantha Cooray, Professor in the Department of Physics and Astronomy.

Junior Specialist at JPL (Jet Propulsion Laboratory), Pasadena, California, from 13 June to 13 July, 2011 in collaboration with Dr. Graca Rocha.

Member of Planck collaboration.

Member of Euclid collaboration.

IV. Other

Prize of the Wolfram Mathematica 8 for the best talk at the conference "Miami2010: A topical conference on elementary particles, astrophysics, and cosmology"' held in Fort Lauderdale (FL), USA, from 14th to 19th of December, 2010.

2010 List of Publication:

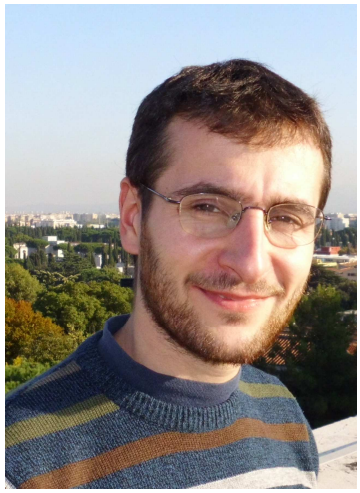
2009 (www.citebase.org/abstract:arXiv.org:0909.3584," published on Phys. Rev. D80:087302,2009".) "`New Constraints on variations of the fine structure constant from CMB anisotropies"' E. Menegoni, S. Galli, J. Bartlett, C. Martins, A. Melchiorri

2009 "`Constraints on the dark energy equation of state in presence of a varying fine structure constant"' (IJMPD, International Journal of Modern Physics D, Volume 19, Issue 04, pp. 507-512 2010). E. Menegoni, S. Pandolfi, S. Galli, M. Lattanzi, A. Melchiorri

2010 (Physical Review D, vol. 82, Issue 2, id. 023532, (2010)) "`Varying couplings in the early universe: correlated variations of α and G"' C.J.A.P. Martins, E. Menegoni, S. Galli and A. Melchiorri

E. Menegoni, "New Constraints on Variations of Fine Structure Constant from Cosmic Microwave Background Anisotropies", GRAVITATIONAL PHYSICS: TESTING GRAVITY FROM SUBMILLIMETER TO COSMIC: Proceedings of the VIII Mexican School on Gravitation and Mathematical Physics. AIP Conference Proceedings, Volume 1256, pp. 288-292 (2010).
A. Melchiorri, F. De Bernardis, E. Menegoni, "Limits on the neutrino mass from cosmology". GRAVITATIONAL PHYSICS: TESTING GRAVITY FROM SUBMILLIMETER TO COSMIC: Proceedings of the VIII Mexican School on Gravitation and Mathematical Physics. AIP Conference Proceedings, Volume 1256, pp. 96-106 (2010).
`Constraining Variations in the Fine Structure Constant in the presence of Early Dark Energy"' Erminia Calabrese, Eloisa Menegoni, C.J.A.P. Martins, Alessandro Melchiorri, Graca Rocha. Phys.Rev.D84:023518,2011:arXiv:1104.0760v1 (2011).

Muccino Marco



Position: PhD student
Period covered: 2010/2011

I Scientific Work
Gamma Ray Bursts (GRBs)

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

IRAP Ph.D. Erasmus Mundus Workshop
Recent News from the Mev, GeV and TeV Gamma-Ray Domains
March 21-26, 2011 Pescara (Italy)

IRAP Ph.D. Erasmus Mundus school
May 25th - June 10th, 2011 Nice (France)

HEPRO III
High Energy Phenomena in Relativistic Outflows III
June 27 - July 1, 2011 Barcelona (Spain)

12th Italian-Korean Symposium on Relativistic Astrophysics
July 4-8, 2011 Pescara (Italy)

IRAP Ph Erasmus Mundus School
September 5th - 16th, 2011 Nice (France)

IRAP Ph.D. Erasmus Mundus Workshop
Gamma Ray Bursts, their progenitors and the role of thermal emission
October 2-7, 2011 Les Houches (France)

Third Galileo - Xu Guangqi meeting
THE SUN, THE STARS, THE UNIVERSE and GENERAL RELATIVITY
October 11-15, 2011 Beijing (China)

III. Service activities
Within ICRANet

- *High Energy emission in GRBs, in collaboration with L. Izzo and prof. R. Ruffini*
- *Genuine Short GRBs, in collaboration with C.L. Bianco, L. Izzo, A.V. Penacchioni and prof R. Ruffini*
- *Double component GRBs, in collaboration with C.L. Bianco, L. Izzo, A.V. Penacchioni, G. Pisani and prof R. Ruffini*
- *Lecture: IRAP Ph Erasmus Mundus School, September 5th - 16th, 2011 Nice (France) "High Energy emission in GRBs: the case of GRB 090902B"*

IV. Other
Poster:
HEPRO III

High Energy Phenomena in Relativistic Outflows III
June 27 - July 1, 2011 Barcelona (Spain)
" A double component in the emission of GRB 090618"
L. Izzo, R. Ruffini, A. V. Penacchioni, S. K. Chakrabarti, M. Muccino, Jorge A. Rueda, A. Nandi, C. L. Bianco, L. Caito, B. Patricelli

Pandolfi Stefania

Position: 3rd year IRAP PhD Student (VII cycle)
Period covered: 1Nov 2008 – 30 Oct 2011

I Scientific Work

1. Data-constrained reionization and its effect on cosmological parameters Stefania Pandolfi, Andrea Ferrara, T. Roy Choudhury, Alessandro Melchiorri, Sourav Mitra
submitted to PRD, arXiv:1111.3570v1 [astro-ph.CO]

2. Constraints on massive sterile neutrino species from current and future cosmological data. Elena Giusarma , Martina Corsi, Maria Archidiacono, Roland de Putter, Alessandro Melchiorri , Olga Mena , Stefania Pandolfi.
Published in Phys.Rev. D83 (2011) 115023, e-Print: arXiv:1102.4774 [astro-ph.CO]

3. Impact of general reionization scenarios on extraction of inflationary parameters Stefania Pandolfi, Elena Giusarma, Edward W. Kolb, Massimiliano Lattanzi, Alessandro Melchiorri, Olga Mena, Manuel Pena, Asantha Cooray, and Paolo Serra,
Phys.Rev.D82:123527,2010 , arXiv:1009.5433v1 [astro-ph.CO].

4. CMB neutrino mass bounds and reionization M. Archidiacono, A. Cooray, A. Melchiorri, S. Pandolfi, Phys. Rev. D 82, 087302 (2010), arXiv:1010.5757 [astro-ph.CO].

5. The Herschel-SPIRE Legacy Survey (HSLS): the scientific goals of a shallow and wide submillimeter imaging survey with SPIRE A. Cooray et al., HSLS Science Team,
arXiv:1007.3519 [astro-ph.CO]

6. Harrison-Zel'dovich primordial spectrum is consistent with observations S. Pandolfi, A. Cooray, E. Giusarma, E. W. Kolb, A. Melchiorri, O. Mena and P. Serra, Phys.
Rev. D 81, 123509 (2010) - Published June 9, 2010, arXiv:1003.4763 [astro-ph.CO].

7. Inflation with primordial broken power law spectrum as an alternative to the concordance cosmological model Stefania Pandolfi, Elena Giusarma, Massimiliano Lattanzi, Alessandro Melchiorri, Phys. Rev. D 81, 103007 (2010) - Published May 24, 2010

8. Constraints on the dark energy equation of state in presence of a varying fine structure constant Eloisa Menegoni, Stefania Pandolfi, Silvia Galli, Massimiliano Lattanzi, and Alessandro Melchiorri, International Journal of Modern Physics D, Vol. 19, No. 4
(2010) pp. 507-512

9. No evidence for dark energy dynamics from a global analysis of cosmological data Paolo Serra, Asantha Cooray, Daniel E. Holz, Alessandro Melchiorri, Stefania Pandolfi, and Devdeep Sarkar, Phys. Rev. D 80, 121302 (2009), Rapid Communication,
Published December 29, 2009

10. When Did Cosmic Acceleration Start? Alessandro Melchiorri, Luca Pagano, Stefania Pandolfi, Phys. Rev. D 76, 041301, Rapid Communication, (2007)

II Conferences and educational activities

II a Conferences and Other External Scientific Work

- "Inflation in a general reionization scenario'' Essential Cosmology for the Next Generation, Puerto Vallarta , Mexico, January 10-14, 2011
- "Constraints on Inflation in extended cosmological scenarios" Dark Cosmology Center (DARK), Copenhagen, Denmark, 27 - 28 January
- "Joint Astrophysical and Cosmological constrains on reionization", DAVID WORKSHOP VI, Scuola Normale Superiore, Pisa, October 18-20 2011

III. Other

- Member of the LOC od the DEUS Dark Summer Workshop 8-12 August 2011, Copenhagen, Denmark.
- Member of the LOC of Azores School on Observational Cosmology, 31 August- 6 September 2011, Angra do Heroismo, Azores, Portugal

2011 List of Publication

1. Data-constrained reionization and its effect on cosmological parameters Stefania Pandolfi, Andrea Ferrara, T. Roy Choudhury, Alessandro Melchiorri, Sourav Mitra
submitted to PRD, arXiv:1111.3570v1 [astro-ph.CO]

2. Constraints on massive sterile neutrino species from current and future cosmological data. Elena Giusarma , Martina Corsi, Maria Archidiacono, Roland de Putter, Alessandro Melchiorri , Olga Mena , Stefania Pandolfi.
Published in Phys.Rev. D83 (2011) 115023, e-Print: arXiv:1102.4774 [astro-ph.CO]

3. The impact of Reionization modelling on CMB Neutrino Mass Bounds, M. Archidiacono, A. Melchiorri, S. Pandolfi, Proceedings of the Neutrino Oscillation Workshop (Sept. 2010), Nuclear Physics B Proceedings Supplements, Volume 217, Issue 1, p. 65-67.

4. Impact of general reionization scenarios on extracting inflationary parameters , Proceedings of the 25th Texas Symposium on Relativistic Astrophysics (Dec. 2010), PoS (Texas 2010) 263

Sigismondi Costantino

Position: Professor
Period covered: year 2011

I Scientific Work

High precision measurement of the solar diameter from the ground

The international collaboration, named Clavius, includes IRSOL (Switzerland, www.irsol.ch), IAP and Nice University (France), Como University, Observatorio Nacional Rio de Janeiro

II Conferences and educational activities

II a Conferences and Other External Scientific Work

March 1, 2011 PhD committee Observatorio Nacional Rio de Janeiro of S. C. Boscardin
April 5, 2011 MAST Rio de Janeiro conference: Gerbert of Aurillac uma personalidade do seculo X pelo seculo XXI
June 2, 2011 Friedmann Seminar CBPF Rio de Janeiro, talk
June 21, 2011 MAST Rio de Janeiro conference: As meridianas na Igreja
September, 28, 2011 Paris Observatory: Gerbert of Aurillac le pape astronome
October 11, 2011 GX3 Meeting, Beijing, invited chairman of solar physics session

II b Work With Students

Giulia de Rosi, Laboratory of AstrophysicsSapienza University of Rome, July 13, 2011

II c Diploma thesis supervision

Andrea Raponi, Master Thesis on solar physics Sapienza University of Rome, July 18, 2011

II d Other Teaching Duties

History of Astronomy course UPRA, Rome

II e. Work With Postdocs

Xiaofan Wang, NAOC Beijing

III. Service activities

III a. Within ICRANet

Draconids meteor shower monitor with airborne observations (october, 8, 2011) with IMO www.imo.net

Delta Scorpii 2011 periastron observational campaign (april, 1-october 16, 2011) with AAVSO www.aavso.org for the Centennial Meeting (Boston, 4 -7 october 2011)

2011 List of Publication

Sigismondi, Costantino
Delta Scorpii 2011 periastron: visual and digital photometric campaign

Raponi, Andrea; Sigismondi, Costantino; Guhl, Konrad; Nugent, Richard; Tegtmeier, Andreas
The Measurement of Solar Diameter and Limb Darkening Function with the Eclipse Observations

Sigismondi, Costantino
Misura del ritardo accumulato dalla rotazione terrestre, DUT1, alla meridiana clementina della Basilica di Santa Maria degli Angeli in Roma

Sigismondi, Costantino
Delta Scorpii 2011 periastron: worldwide observational campaign and preliminary photometric analysis

Sigismondi, Costantino
Measuring the Earth-Sun distance during a lunar eclipse

Sigismondi, Costantino
Introduction to pinhole astronomy

Sigismondi, Costantino
Variable stars magnitudes estimations exploiting the eye physiology

Sigismondi, Costantino
Occultazione asteroidale di 474 Prudentia su HIP 1927 con pre-pointing

Sigismondi, Costantino
Astronomy in the Church: the Clementine Sundial in Santa Maria degli Angeli, Rome

Sigismondi, Costantino
Moti e distanze angolari in cielo con telescopio e cronometro

Sigismondi, Costantino
Daytime Seeing and Solar Limb Positions

Sigismondi, Costantino
Ground-based measurements of solar diameter

Sigismondi, Costantino
Misure quantitative del seeing atmosferico

Sigismondi, Costantino
Incontri celesti, vita del padre Clavio in cinque atti

Sigismondi, Costantino
Impatti lunari: frequenze e monitoraggio

Sigismondi, Costantino
Misura del diametro solare ad almucantarat zero

Sigismondi, Costantino
L'Epistolario di Gerberto, papa astronomo

Sigismondi, Costantino
Lo Gnomone Clementino: Astronomia Meridiana in Chiesa dal '700 ad oggi

Sigismondi, Costantino; Nugent, Richard; Dangl, Gerhard
Measuring solar disk shape up to relativistic accuracy: the role of scintillation in ancient naked eye data

Sigismondi, Costantino
Relativistic implications of solar astrometry

Sigismondi, Costantino
Sunsets and solar diameter measurement

Sigismondi, Costantino
Picard satellite for solar astrometry

Sigismondi, Costantino; Raponi, Andrea; Bazin, Cyril; Nugent, Richard
Towards a unified definition of solar limb during central eclipses and daily transits

Sigismondi, Costantino; Morcos, A. B.
Long term variations of solar radius

Sigismondi, Costantino
Overcoming Black Drop Effect in High Resolution Astrometry:. the Case of Sea Sunsets

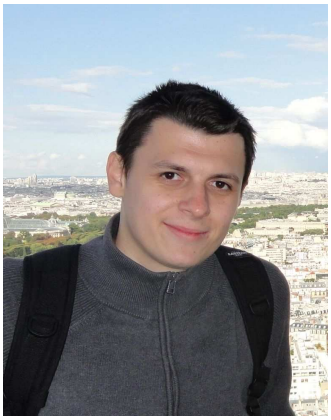
Sigismondi, Costantino
Relativistic Corrections to Lunar Occultations

Sigismondi, C.
Gerberto, gli Arabi e Gerusalemme

Sigismondi, C.
La Sfera di Gerberto

Sigismondi, C.
GERBERTVS una nuova rivista per l'astronomia e la scienza nell'alto medioevo

Baranov Andrey



Position: PhD student (Erasmus Mundus Program),
LAPTH, Universite de Savoie, Annecy-le-Vieux, France
Period covered: 09/2010-09/2013

I Scientific Work

The title of my thesis is “Pair instability supernovae explosion and gamma-ray bursts”. I am working under supervision of Prof. Pascal Chardonnet. My work is to make numerical simulations and physical analysis of pair-instability supernovae explosions and to check if they could be related to GRBs.

II Conferences and educational activities

Conferences and Other External Scientific Work

Workshop ”From nuclei to white dwarfs and neutron stars”, Les Houches, France, April 3-8, 2011.
Workshop ”Gamma ray bursts, their progenitors and the role of thermal emission”, Les Houches, France, October 2-7, 2011
Erasmus Mundus schools in University of Nice
September 6-24, 2010
May 25 - June 10, 2011
September 5-17, 2011

Benedetti Alberto

Position: 2nd year Erasmus Mundus PhD Student
Period covered: September 2011 –

I Scientific Work

I study the production of electron-positron pairs by strong electric fields. The aim of my study is the comprehension of the behavior of these particles and their back reaction to the external field once thy are produced. We take into account the interactions between them solving numerically the relativistic Boltzmann equation; indeed we expect that plasma reaches the thermal equilibrium after a characteristic time scale, which depends on the initial field.

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II Conferences and educational activities

II a Conferences and Other External Scientific Work

"On the frequency of oscillations in the pair plasma generated by a strong electric field"
Alberto Benedetti, W.-B. Han, R. Ruffini, G.V. Vereshchagin
IRAP Ph.D. Erasmus Mundus Workshop, April 5, 2011, Pescara (Italy)

"On the frequency of oscillations in the pair plasma generated by a strong electric field"
Alberto Benedetti, W.-B. Han, R. Ruffini, G.V. Vereshchagin\ \
IRAP Ph.D. Erasmus Mundus Workshop, April 3-8, 2011, Les Houches (France)

"Oscillations in the pair plasma generated by a strong electric field"
Alberto Benedetti, W.-B. Han, R. Ruffini, G.V. Vereshchagin
Italian-Korean Meeting, July 4-9, 2011, Pescara (Italy)

"Electron-Positron plasma oscillations: hydro-electrodynamic and kinetic approaches"
Alberto Benedetti, R. Ruffini, G.V. Vereshchagin
IRAP Ph.D. Erasmus Mundus School, September 7, 2011, Nice (France)

"Boltzmann equation: from an interacting plasma toward the photospheric emission of a GRB"
Alberto Benedetti, A. Aksenov, R. Ruffini, I. Siotsou, G.V. Vereshchagin
IRAP Ph.D. Erasmus Mundus Workshop, October 6, 2011, Les Houches (France)

"Electron-Positron plasma oscillations: hydro-electrodynamic and kinetic approaches"
Alberto Benedetti, A. Aksenov, R. Ruffini, I. Siutsou, G.V. Vereshchagin
Galileo-Xu Guanqui Meeting, October 12, 2011, Beijing (China)

2010 List of Publication

"On the frequency of oscillations in the pair plasma generated by a strong electric field"
A. Benedetti, W.-B. Han, R. Ruffini, G.V. Vereshchagin, Physics Letters B 698 (2011) 75–79

Dutta Parikshit

Position: IRAP Erasmus Mundus Phd. Student at the
Max Plank Institute for Gravitational Physics
under the Supervision of Prof. Hermann Nicolai

Period covered: From September 2010 to present

I Scientific Work

Working on the DeWitt Equation for finite Supersymmetric Field Theories. The DeWitt Equation is an exact equation for the Effective Action which generates all the n-point connected correlation functions. Firstly we looked at N=1 Wess Zumino model and formulated the equation for the case, in both component field formalism and Super space formalism. We looked at possible ways of application to N=4 Supersymmetric Yang Mills Theory. We tried to work it out using the On Shell Lagrangian of the model but found out that it only works for Off Shell formalism. As there is no Off Shell formalism for model, as it needs infinite number of auxiliary fields to close the SUSY algebra, it is very difficult to use the current model . Thus we are currently looking at the Light Cone gauge formalism of the model, as in this case we do not need auxiliary fields to close the algebra Off Shell. Calculation of self energy of the fields in the Light Cone gauge is also looked at to better understand the finiteness of the model, which also includes the Mandelstam prescription for evaluation integrals in Light Cone Gauge.

II Conferences and educational activities

II a Conferences and Other External Scientific Work:

Erasmus Mundus IRAP meetings in NICE, in Spetember 2010 and 2011, ICRANet meeting in Pescara October 2010 and Les Houches March 2011.

Fleig Philipp

Position: PhD Student
Period covered: Sept. 2010- Sept. 2013

I Scientific Work

Throughout the last year I have been working at the Albert-Einstein-Institute in Potsdam, Germany under the supervision of Professor Hermann Nicolai. My general area of research is concerned with the problem of how to quantise gravity. Our approach to the problem is based on the conjecture that theories of gravity, like General Relativity for example, possess large hidden symmetries structures. By studying these symmetries we hope to gain deeper insights into how gravity "works" and ultimately also how to quantise it.
For the first six months of the past year I have been working on the mathematical problem of determining the shape and volume of fundamental domains of hyperbolic Coxeter-Weyl groups. This work was done in collaboration with Prof. Hermann Nicolai and Michael Koehn and the results are published in the Letters of Mathematical Physics journal.
In the last half year I have been working on low-energy expansions of String Theory. In this work the effective action of a particular string theory is considered, which is written as an expansion in the string length. What I am particularly interested in is the fact that the coefficients of the various orders in the expansion of type-IIa/b string theory are given by automorphic forms. The hope is that by understanding the precise structure and appearance of these automorphic forms one can gain deeper insights into some aspects of M-Theory. Ideally we would also like to understand this work in the context of fundamental symmetries which underlie String Theory. This work in progress is a collaboration with Prof. Hermann Nicolai and Axel Kleinschmidt.

II Conferences and educational activities

II a Conferences and Other External Scientific Work
TEXAS Meeting 2010 Heidelberg,
CERN Winter School on Supergravity and Gauge Theories 2011, Geneva,
ICRANet general meeting march 2011, Pescara,
Quantum Theory and Gravitation conference, ETH Zuerich,
Quantum Gravity workshop, CERN Geneva
Max-Planck PhDnet meeting 2011, Bonn

III. Other

PhD representative at the AEI Max-Planck-Institute

2010 List of Publication

P. Fleig, M. Koehn and H. Nicolai, On fundamental domains and volumes of hyperbolic Coxeter-Weyl groups, [arXiv:1103.3175 [math.RT]] ; to appear in Letters of Mathematical Physics.

Gregoris Daniele

Position: Erasmus Mundus Ph.D. student
Stockholm department of physics
Period covered: 1st September 2011- 31st August 2014

I Scientific Work

Bachelor thesis: "Trattamento algebrico dei problemi quantistici" under the supervision of Prof. GianCarlo Ghirardi.
Master thesis: "Equazione di Boltzmann in spazio curvo: formulazione e applicazioni in relatività generale" under the supervision of Prof. Remo Ruffini and Dr. Donato Bini.
Thesis for the "percorso di eccellenza" at the University "La Sapienza": "Formula di massa di un buco nero" under the supervision of Prof. Remo Ruffini and Dr. Donato Bini.
Now I am working on the inhomogeneous cosmology models under the supervision of prof. Kjell Rosquist.

II Conferences and educational activities

12th Italian-Korean Symposium on Relativistic Astrophysics, July 4-8, 2011 with the talk "Boltzmann equation in curved space: formulation and applications in general relativity".

IRAP Ph.D. Erasmus Mundus school, September 5th-16th, 2011, Nice.

Gruber Christine

Position: PhD Student
Period covered: September 2010 - present

I Scientific Work

Dark energy from vacuum energy contributions of bosonic and fermionic fields in the universe.

II Conferences and educational activities

Conferences and Other External Scientific Work

2011, September 5th-17th: Talk at the Erasmus Mundus Summer School, Université de Nice Sophia-Antipolis, Nice, France.

Work With Students

Summer internship RISE (Research Internships in Science and Engineering): supervision of a Bachelor student from Yale University for a summer internship (June – August 2011).

Other Teaching Duties

Free University Berlin: Fall term 2010/11: Tutorial for Theoretical Physics III: Electrodynamics
Fall term 2011/12: Tutorial for Theoretical Physics III: Electrodynamics

2011 List of Publications

F. Scardigli, C. Gruber, P. Chen, "Black Hole Remnants in the Early Universe", Phys. Rev. D 83, 063507 (2011).

Liccardo Vincenzo

Position: PhD Student
Period covered: October 2010- October 2013

I Scientific Work

The LAUE project for broadband gamma-ray focusing lenses. Laboratory activity devoted to the study of the features of the X-ray facility in Ferrara (LARIX).

II Conferences and educational activities

II a Conferences

- Attendance to the 25th Symposium of Relativistic Astrophysics "Texas 2010", Heidelberg, Germany, December 6th -10th, 2010.
- Attendance to the "IRAP PhD. Erasmus Mundus Workshop", Les Houches, France, 3rd- 8th April, 2011.
- Attendance to the "Erasmus Mundus School", Nice, France, 23th May - 6th June, 2011.
- Attendance to the "Erasmus Mundus School", Nice, France, 5th - 13th September, 2011.
- Attendance to the "SPIE Optics + Photonics 2011 Conference", San Diego CA, USA, 19th – 26th August 2011
- Attendance to the "Second Ferrara Workshop on X-Ray astrophysics up to 511keV", Ferrara, Italy, 14th-16th September, 2011.
- Attendance to the "Third Galileo-Xu Guangqi" meeting, Beijing, China, 11th- 15-th October, 2011.

II b Diploma thesis supervision: Dr. Luciano Di Fiore, Prof. Leopoldo Milano

2010 List of Publication

Conference Proceedings:

- E. Virgilli, F. Frontera, V. Valsan, V. Liccardo, E. Caroli, J. B. Stephen, F. Cassese, L. Recanatesi, M. Pecora, S. Mottini, P. Attiná and B. Negri, "The LAUE project for broadband gamma-ray focusing lenses", Proc. SPIE 8147, 81471C (2011); doi:10.1117/12.895236

- E. Virgilli, F. Frontera, V. Valsan, V. Liccardo, V. Carassiti, F. Evangelisti and S. Squerzanti, "Laue lenses for hard x-/soft γ-rays: new prototype results", Proc. SPIE 8147, 81471B (2011); doi:10.1117/12.895233

- L. Carbone, A. Cavalleri, G.Ciani, R. De Rosa, L. Di Fiore, R. Dolesi, F. Garufi, A. Grado, M. Hueller, V. Liccardo, L. Milano, D. Nicolardi, D. Tombolato, S. Vitale, P. J. Wass and W. J.Weber. "An Optical Read-Out system for the Trento Four-mass Tor- sion Pendulum Facility", (Poster paper at 8TH Edoardo Amaldi conference on gravitational wave 22-26 June 2009)

Machado de Oliveira Fraga Bernardo

Position: PhD student
Period covered: 2010-2013

I Scientific Work

Together with Carlos Arguelles and Remo Ruffini I studied a model for dark matter as a system of semidegenerated fermions that also tries to explain the central objects in galaxies. This model agrees with the universality of the dark matter surface density, and with other phenomenological results up to groups of galaxies, but so far is unable to reproduce the results for clusters. We are currently working in the subject.

II Conferences and educational activities

II a Conferences and Other External Scientific Work

IRAP Ph.D. Erasmus Mundus School, May 25-June 10 2011 Nice, France
Recent News from the MeV, GeV and TeV Gamma-Ray domains, March 21-26 Pescara, Italy
From Nuclei to White Dwarfs and Neutron Stars, April 3-8 Les Houches, France
IRAP Ph.D. Erasmus Mundus School, September 5-16 2011, Nice, France
3rd Galileo-Xu Guangqi Meeting, 12-16 October 2011 Beijing, China

Martins de Carvalho Sheyse

Position: PhD Student
Period covered: 2011

I Scientific Work

The classic work of Oppenheimer and Volkoff (1939) addresses the problem of the construction of configurations of equilibrium of neutron stars composed only by neutrons, within the Einstein theory of relativity. For the more general case when protons and electrons are also present in neutron star interiors, in nearly all of the scientific literature it is assumed that the condition of local charge neutrality applies inside the neutron star, namely, no electromagnetic interactions between protons and electrons are considered at all. Consequently, the corresponding solutions of the Einstein equations for a non-rotating neutron star, following the work of Tolman (1939) and of Oppenheimer and Volkoff (1939), have been systematically adopted.
In our research work we prove that this approach is conceptually inconsistent as soon as a self-gravitating system of neutrons, protons and electrons is considered. Therefore, we work on a self-consistent theory of neutron stars in the framework of general relativity, including all the interactions between particles with particular emphasis on the electromagnetic interactions between protons and electrons. The analysis of the properties of the new neutron star equilibrium configurations and their consequence on the process of gravitational collapse to a black hole is one the main goals of our research project.
The observation of the late X-ray emission of the Gamma-Ray Bursts (GRBs) associated to Supernova explosions within the so-called GRB-Supernova connection problem has evidenced the possibility of witnessing the thermal evolution of neo-neutron stars: neutron stars just formed in the Supernova event with expected very large temperatures of tens of billion degrees. Therefore, we are exploring the effects of very large temperatures on the equation of state of nuclear matter at high densities important for neutron stars as well as on the different emission mechanisms leading to the cooling of such newly-born neutron stars.

II Conferences and educational activities

Conferences and Other External Scientific Work
-Recent News from the Mev, GeV and TeV Gamma-Ray Domains, March 21-26, 2011 Pescara (Italy)
-From Nuclei to White Dwarfs and Neutron Stars, April 3-8, 2011 Les Houches (France)
-IRAP Ph.D. Erasmus Mundus school, May 25th - June 10th, 2011
-IRAP Ph.D. Erasmus Mundus school, September 5th - 16th, 2011
-THIRD GALILEO - XU GUANGQI MEETING, OCTOBER 11-15, 2011

Penacchioni Ana Virginia

Position: PhD Student
Period covered: October 2010- October 2013

I Scientific Work

Reduction of data and data analysis of GRBs. Theoretical work within the fireshell scenario.

II Conferences and educational activities

II a Conferences

- Attendance to the 25th Symposium of Relativistic Astrophysics "Texas 2010", Heidelberg, Germany, December 6th -10th, 2010.
- Attendance to the "IRAP PhD. Erasmus Mundus Workshop", Les Houches, France, 3rd- 8th April, 2011.
- Attendance to the "Fermi Symposium", Rome, Italy, 9th- 12th May, 2011.
- Attendance to the meeting "GRBs as probes: from the progenitor's environment to the high redshift universe", Como, Italy, 16th-20th May, 2011.
- Attendance to the international meeting "High Energy Phenomena in Relativistic Outflows III" (HEPRO III). Barcelona, 27th June- 1st July, 2011.
- Attendance to the "Erasmus Mundus School", Nice, France, 5th - 13th September, 2011.
- Attendance to the "Second Ferrara Workshop on X-Ray astrophysics up to 511keV", Ferrara, Italy, 14th-16th September, 2011.
- Attendance to the "IRAP PhD. "Erasmus Mundus Workshop", Les Houches, France, 2nd- 6th October, 2011.
- Attendance to the "Third Galileo-Xu Guangqi" meeting, Beijing, China, 11th- 15-th October, 2011.

II c Diploma thesis supervision: Dr. Gustavo Romero

Pisani Giovanni Battista

Position: PhD student, Erasmus Mundus program, 1st year
Period covered: September 2011 - today

I Scientific Work

Reduction of data and data analysis of GRBs. Theoretical work within the fireshell scenario.

II Conferences and educational activities

II a Conferences and Other External Scientific Work

- Attendance to the "Erasmus Mundus School"
  Nice, France
  5th - 17th September, 2011;

- Attendance to the "IRAP PhD. "Erasmus Mundus Workshop"
  Les Houches, France
  2nd - 6th October, 2011;

- Attendance to the "Third Galileo-Xu Guangqi" meeting
  Beijing, China
  11th - 15th October, 2011.

Valsan Vineeth

Position: IRAP-EM PhD.
Period covered: 2010-2013
Supervisor: Prof. Filippo Frontera, University of Ferrara.

I Scientific Work

Configuration studies for broad band X-/Gamma-ray astronomy missions.

Developing focusing telescopes for hard X-/soft gamma-rays (70-600 keV) based on Laue lenses, including the study of possible payload configurations for future broad band X-ray missions. The thesis will deal on science objectives that can be solved with this new instrumentation.

II Conferences and educational activities

II a Conferences and Other External Scientific Work

- Attended the 25th Symposium of Relativistic Astrophysics "Texas 2010", Heidelberg, Germany, December 6th -10th, 2010.
- Attended the "IRAP PhD. Erasmus Mundus Workshop", Les Houches, France, 3rd- 8th April, 2011.
- Attended the "Erasmus Mundus School", Nice, France, 23rd May - 6th June, 2011.
- Attended the "Erasmus Mundus School", Nice, France, 5th - 13th September, 2011.
- Attended the "SPIE Optics + Photonics 2011 Conference", San Diego CA, USA, 19th – 26th August 2011
- Attendance to the "Second Ferrara Workshop on X-Ray astrophysics up to 511keV", Ferrara, Italy, 14th-16th September.

2010 List of Publication

Conference Proceedings:

- E. Virgilli, F. Frontera, V. Valsan, V. Liccardo, E. Caroli, J. B. Stephen, F. Cassese, L. Recanatesi, M. Pecora, S. Mottini, P. Attiná and B. Negri, "*The LAUE project for broadband gamma-ray focusing lenses*", Proc. SPIE 8147, 81471C (2011); doi:10.1117/12.895236

- E. Virgilli, F. Frontera, V. Valsan, V. Liccardo, V. Carassiti, F. Evangelisti and S. Squerzanti, "*Laue lenses for hard x-/soft γ-rays: new prototype results*", Proc. SPIE 8147, 81471B (2011); doi:10.1117/12.895233

Wu Yuanbin

Position: PhD student
Period covered: 2011-2014

I Scientific Work

Under the supervision of Prof. Xue, I started to study the soliton stars. We mainly considered the σ model and included the gravitational field. Now we are trying to find out the soliton solution in this case.

II Conferences and educational activities

II a Conferences and Other External Scientific Work

September 5-16, IRAP PhD school, Nice, France.
October 2-7, IRAP PhD Erasmus Mundus Workshop "Gamma Ray Bursts, their progenitors and the role of thermal emission", Les Houches, France.
October 11-15, Third Galileo - Xu Guangqi meeting, Beijing, China.

Adamo Cristina

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Telephone	+39 085 23054205
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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.

Barbaro Pina

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Work experiences

02.11.2010	Introduction in the third functional F1 area: Administrative and Consular Officer
15.11.2006	Introduction in the C Functional Area, qualification: Administrative, Consular and Social Adjunct officer
16.05.2001	Introduction in the Functional B3 area, qualification: Administrative collaborator
01.02.1983	Introduction in the Foreign Ministry, qualification: B2 Administrative Assistant

Service in Italy

04.09.2007	Press and information service
01.02.2002	General Direction of the Staff
01.09.1995	General Direction Political Affairs
01.02.1983	General Direction Cultural Affairs

Service abroad

From 2008	Nice – Detached at the International Organization ICRANet
From 2002 to 2007	Nice – Italian General Consulate
From 1990 to 1995	Bruxelles – Permanent Italian Representative at the Athlantic Council

Missions abroad

In the course of 2002	Alessandria d'Egitto – Italian General Consulate
In the course of 1997	New York – Permanent Italian Representative at the United Nations
In the course of 1990	New York – Permanent Italian Representative at the United Nations
In the course of 1986 – 1988 e 1989	Bruxelles – Permanent Italian Representative at the Athlantic Council

Education and competences

15.03.1985	Degree in Political Sciences – University of Rome "La Sapienza"

Languages:

French	Excellent
English	Good
Spanish	Elementary

Computer Skills

Word – Excel - Internet

Del Beato Annapia

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I-65122 Pescara (Italy)

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Work experiences

Dates	02/2008 - present
Occupation or position held	Responsible for the Documentation Center of ICRANet
Main activities and responsibilities	meeting planning (before and during the event) proceedings publication websites contents public relations (press contact, submission of conference announcements, contacts with researchers and students, etc…) collection and cataloguing of scientific publications management of the library
Name and address of employer	ICRANet
Address	P.zza della Repubblica 10 I-65122 Pescara (Italy)

Dates	13/06/2007 - 31/12/2007
Occupation or position held	Employee at the Information Point of the Azienda Speciale "D. Ferrigno"
Main activities and responsibilities	Responsible for the external relations of the Azienda Speciale Deborah Ferrigno of the Municipality of Montesilvano in the information point called “Sportello Sociale”.
Name and address of employer	Azienda Speciale "D. Ferrigno" - Municipality of Montesilvano
Address	Palazzo Baldoni -P.zza I. Montanelli I-65016 Montesilvano (Italy)

Dates	04/06/2007 - 31/01/2008
Occupation or position held	English teacher
Main activities and responsibilities	English Teaching in a Training Course at the Engineering Office “Studio Proima s.r.l.”
Name and address of employer	Studio Proima srl
Address	C.so Umberto I I-65016 Montesilvano (Italy)

Dates	15/02/2007 - 31/05/2007

Occupation or position held	English Teacher
Main activities and responsibilities	English teaching in courses organized by Centro Studi Stoa in the following public schools: I° Circolo “Ravizza” Chieti, Istituto comprensivo S. Giovanni Teatino (via Di Nisio, via Mazzini, via V.Emanuele)
Name and address of employer	Centro Studi Stoa
Address	V. San Paolo 2 I-65016 Montesilvano (Italy)

Dates	09/04/2006 - 31/12/2006
Occupation or position held	Employee at EURODESK
Main activities and responsibilities	Employed at Azienda Speciale “D. Ferrigno” of the Municipality of Montesilvano for the opening of a EURODESK. A particular attention was given to the social integration and assistance, as well as to the activities aiming at making easier the access and the fruition of the municipal facilities to disadvantage and needy subjects
Name and address of employer	Azienda Speciale "D. Ferrigno" - Municipality of Montesilvano
Address	P.zza I. Montanelli I-65016 Montesilvano (Italy)

Dates	09/2005 - 03/2006
Occupation or position held	English teacher
Main activities and responsibilities	English Teaching in the Project “Comunicare in Europa POR – Asse C – Misura 2 Az. 3” funded by CEE, realised by Liceo Scientifico C. D’Ascanio in Montesilvano in collaboration with Regione Abruzzo
Name and address of employer	Liceo Scientifico "C. D'Ascanio"
Address	V. Verrotti I-65016 Montesilvano (Italy)

Dates	01/2005
Occupation or position held	Hostess at a Communication Agency
Main activities and responsibilities	reception and registration assistance during the conferences
Name and address of employer	Virgola Comunicazione
Address	V. R. Sanzio I-65122 Pescara (Italy)

Education and training

Dates	02/2006 - 12/2006
Title of qualification awarded	I° level Master “How to teach English”
Principal subjects / occupational skills covered	English and German linguistics psycholinguistic sociolinguistic

	didactics computer skills 240 training hours as English teacher at Liceo Scientifico C. D'Ascanio Montesilvano.
Name and type of organisation providing education and training	Università degli Studi "G. D'Annunzio"
Address	V. dei Vestini, 66100 Chieti (Italy)
Dates	09/2003 - 03/2004
Title of qualification awarded	Erasmus EU-funded Scholarship
Principal subjects / occupational skills covered	Courses on: English Literature, American Literature, History and Marketing.
Name and type of organisation providing education and training	University of Warwick (UK)
Address	Coventry (United Kingdom)
Dates	07/2005
Title of qualification awarded	Degree in Foreign Languages and Literature (courses on Tourist Management) with final mark: 110 cum laude.
Principal subjects / occupational skills covered	Courses on: English and French language English and French literature American Literature Italian Literature Touristic Management Economics Marketing Didactics Linguistics Final Thesis on American Literature, title: "Charles W. Chesnutt: *The Marrow of Tradition*"
Name and type of organisation providing education and training	Università degli Studi "G. D'annunzio"
Address	V.le Pindaro, 65124 Pescara (Italy)
Dates	Summer 1998 and 2000
Title of qualification awarded	Summer School Camps in UK
Principal subjects / occupational skills covered	Courses on English language
Name and type of organisation providing education and training	Westminster College - Oxford (United Kingdom) and Roehampton College - Putney, London (United Kingdom)
Dates	06/2000

Title of qualification awarded	High School Degree at Liceo Socio-Psico-Pedagogico with final mark: 100/100.
Principal subjects / occupational skills covered	Psychology Sociology Pedagogy Linguistics
Name and type of organisation providing education and training	Istituto "B. Spaventa"
Address	Città S. Angelo (Italy)

Personal skills and competences

Mother tongue	Italian
Other language(s)	English, French
Social skills and competences	reliable, well-organized, punctual and accurate, able to work in stressful situations, adaptable to work in new situations, able to work in team, helpful
Computer skills and competences	ECDL (European Computer Driving Licence) Microsoft Office (Word, Excel, Powerpoint, Access, Publisher, Outlook)
Driving licence(s)	B

Di Berardino Federica

NAME	FEDERICA DI BERARDINO
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NATIONALITY	Italian
DATE AND PLACE OF BIRTH	31-03-1980 PESCARA

WORK EXPERIENCE

November 2005-November 2007	▪ Head of Secretariat at ICRANet Pescara: coordination of secretariat work, logistic organization for meetings and workshops, translations.
May-October 2005	▪ Travel Agent at "Beg Viaggi" Pescara;
September-June 2005	▪ Italian language training courses for foreign students;
April 2005	▪ Congress Hostess for IN FIERA S.r.l., at "ECOTUR 2005"- Montesilvano;
December 2004	
October-December 2004	▪ Congress Hostess (Marcinelle 2005) for Manoppello Municipality (PE);
January-December 2004	▪ Customer service assistant for Terravision S.r.l. at *Aeroporto d'Abruzzo*, Pescara;
May 2004	▪ English courses for elementary and high school Italian students;
March 2004	▪ Translations from/to English; ▪ Work for Ajilon Agency, Pescara, for distribution of books in the local schools; ▪ Interviews for Customer Satisfaction, for "NETWORK Research Institute S.r.l." at Iper - Città Sant'Angelo;
2001-2004	▪ Researcher for "Informazione e servizi senza barriere"(Agency: NETWORK S.r.l.). ▪ Exhibition Hostess for IN FIERA S.r.l., at "ECOTUR –*Turismo in fiera*" 2001, 2002, 2003, 2004 (at *Palacongressi*, Montesilvano – PE);
2001-2003	▪ Hostess and sales promoter for the agency "Image Service", Città Sant'Angelo (PE);
1998-2000	▪ Birthday party organizer for kids; ▪ Educator and entertainment organizer in summer camps of E.N.I. in Cesenatico; additional training courses (*Cooperativa Sociale* D.O.C. S.c.r.l., Turin).

EDUCATION

June 2004	▪ Foreign Language and Literature College degree, 110/110 *cum laudem*, at University G. D'annunzio (Pescara). Final thesis on Spanish and Economic -Tourism Geography: "Problemi, tendenze e prospettive

dello sviluppo socio-economico in Spagna. Casi di studio" (Supervisor: Prof. G. Massimi);

January 2004
- Researches in Spain for graduation thesis and improvement of Spanish knowledge.

September-December 2002
- "Nazareth College", Rochester, N.Y. (U.S.A.) Four months classes and final exams on English, Marketing and Spanish.

1998
- High School degree at Foreign Languages High School "G. Marconi", Pescara.

October 1996
- English classes at "Irondequoit High-School" in Rochester (N.Y.)

1992, 1994, 1995
- Multiple visits to England to attend English colleges for training courses;
- Visits to the USA (N.Y. e Massachusetts) to improve oral skills for American-English.

SOCIAL-CULTURAL EXPERIENCES

January-March 2005: Trip to Vanuatu (Melanesian archipelago, old "New Hebrides ") for humanitarian aid experience. Voluntary work in a few islands of the archipelago and elementary learning of local language, the Bislama.

PERSONAL SKILLS

Main studies and job experiences focused on foreign cultures and languages. University degree on Spanish and English. Daily practice with both languages through conversation and readings.
The work experience in touristic exhibition and in the "in store promotion" field, in addition to the experience as entertainment organizer, helped to develop interpersonal abilities.

MOTHER-TONGUE: ITALIAN

OTHER LANGUAGES: ENGLISH, SPANISH, FRENCH

RELATIONAL ABILITIES

Team work experience, mainly in multi-cultural contexts.
The two main training experiences in the US high school and later in college supported the personal and professional growth, helped to acquire an open-minded attitude towards other cultures, which are essential for cooperation and mutual respect.
The work as customer service assistant, hostess and sales promoter have been relevant in acquiring professional skills in the relationship with customers: importance of communication, which is the ability to listen to and to be listened.
Development of a positive attitude towards any kind of problematic situation; problem-solving skills and working method based on the achievement of goals.

ORGANIZING COMPETENCES

Organizing ability mainly acquired trough team work in summer camps for kids and teen-agers, where showing a coordinating attitude in the group.
In the same work field has been developed the spirit of adaptability, in addition to the creativity (namely invention of new games and artistic creation for entertainment).
Open and charismatic personality, flexible, active, dynamic, loving challenges.

	Professionalism based on accuracy, punctuality and strong attitude to work towards goals.
TECHNICAL SKILLS	Computer competences: Windows; Software: Word, Excel, Power Point. Daily use of personal computer at work: 80% of the work is based on the use of PC. 2004: Certificate for Informatics Course on "Basic Office" (Word, Excel, Internet e E-mailing) organized by: "E-Work", Pescara in cooperation with "Ok Work", Milano.
ARTISTIC SKILLS	Photography: First-level class and Advanced class Diplomas. Dance: Jazz Dance, Flamenco, Traditional Dances, Artistic Gym. Piano and guitar classes. Great passion for music (jazz, acoustic, ethnic, rock and classic), theatre and readings. Free time: travels, photography and museums.
DRIVING LICENCE	Driving license cat. B

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*

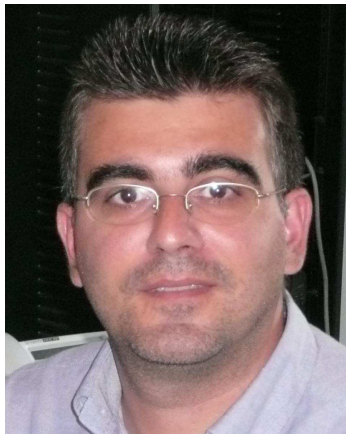
• Date	09/2001 – 11/2005
• Institution	Università degli Studi "G. D'Annunzio" Pescara
• Main Subjects	Financial Mathematics, bank technique, business economics, accountancy, microeconomics, macroeconomics, private and public law, work law, analysis of balance sheet, business strategy and politics
• Achieved 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	
	ITALIAN
MOTHER-TONGUE	
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 reading, writing, travelling, going to the cinema, listening music, playing the piano. I have a determined, dynamic and flexible personality. I like staying and working with people.

Regi Massimo



Personal Data

Name and surname	Massimo Regi
Place, date of birth	Pineto (Te) – October 23, 1974
Military service	community service at Piccola Opera Caritas of Giulianova (TE) done in 2001/2002

Education

2004-2005	"Network Software Specialist" professional qualifications obtained at the S.M.I.L.E. institution on the 26-th of July 2005 in Pescara
1993-2003	University Degree in Information Tecnology and Automation Engineering Thesis: "An Application for an UMTS Service"
2003	University Degree apprenticeship effected at the Sisteda S.p.a. of Aspio di Osimo (AN) in the period of January-April in 2003 and concerning the database design for the web based applications
1988-1993	Scientific School leaving certificate at the Liceo Scientifico Statale of Giulianova (Te) with final marks 56/60

Software principal realizations

Fater s.p.a. Dust Control: application program for the management of the dust measurement in the production factory with graphs of the trend analysis

Morning Area Meeting: application program for daily report of the production Statistics

AMDB: application program for the management of the activities of the production lines maintenance

GLED System web: application program for the automatic forwarding of the production data towards the P&G server in Germany

CMP (Change Management Process): application program for the lines modifying management with an approval workflow

Defects Management in spare parts warehouse Visual Basic application for the CU-Report

Application for the import of the master lines from Excel file (Midrange Module) Sixty s.p.a
Company Intranet: importation and update of the domain users from ldap server to sql server, on the fly pdf generation, routine for the newsletters sending

Municipality of Pescara collaboration for the management of the computerized auction of the wholesale fish market (Linux/Java/MySQL platform)

Informatic knowledge

Operating Systems Windows 98/98SE/ME/2000/XP/2003 and Linux (various distributions)

Networks	local area network LAN, TCP/IP protocol, VPN, Active Directory
Programming languages	PHP, Javascript, Visual Basic 6.0, Java, C, Assembler x86, ASP
Databases	MS SQL Server, MySQL, PostgreSQL

Working experience

April 2008 -	IcraNet (International center for relativistic Astrophysics Network) as System Manager
June2005-March 2008	Infoteam Solution s.r.l. as System Engeneer / Web developer