Staff, Visiting Scientists and Graduate Students at the Pescara Center

November 2009

ICRANet Faculty Staff

- Belinski Vladimir — ICRA
- Bianco Carlo Luciano — ICRANet
- Ruffini Remo — Università di Roma “Sapienza” and ICRANet
- Vereschchagin Gregory — ICRANet
- Xue She-Sheng — ICRANet

Adjunct Professors of the Faculty

- Aharonian Felix Albert — (Benjamin Jegischewitsch Markarjan – ICRANet 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
- Chechetkin Valeri — (Mstislav Vsevolodich Keldysh-ICRANet Chair)
Keldysh institute for Applied Mathematics Moscow, Russia
- Christodoulou Dimitrios — (Bernard Riemann – ICRANet Chair)
ETH, Zurich, Switzerland
- Coppi Bruno — Massachusetts Institute of Technology
- Damour Thibault — (Joseph-Louis Lagrange- ICRANet Chair)
IHES, Bures sur Yvette, France
- Della Valle Massimo — Osservatorio di CapodiMonte, Italy
- Einasto Jaan — Tartu Observatory
- 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
- Jantzen Robert — (AbrahamTaub-ICRANet Chair)
Villanova University USA
- Kleinert Hagen — (Richard Feynmann-ICRANet Chair)
Freie Universität Berlin
- Kerr Roy — (Yevgeny Mikhajlovic Lifshitz-ICRANet Chair)
University of Canterbury, New Zealand
- Misner Charles — (John Archibald Wheeler – ICRANet Chair)
University of Maryland, USA
- Nicolai Herman — Albert Einstein Institute – Potsdam, German
- Novello Mario — (Cesare Lattes-ICRANet Chair)
CBPF, Rio de Janeiro, Brazil
- Pian Elena — INAF and Osservatorio Astronomico di Trieste

• Popov Vladimir	ITEP, Russia
• Punsly Brian Matthew	ICRANet
• Quevedo C. 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	Institut for Theoretical Physics Utrecht Universiteit, Holland
• Titarchuk Lev	(Victor Sobolev – ICRANet Chair) US Naval Laboratory, USA

Lecturers

• Aksenov Alexey	Institute for Theoretical and Experimental Physics
• Alekseev Georgy	Steklov Mathematical Inst- Russian Acad of Sciences
• Bini Donato	CNR and ICRANet, Italy
• Boccaletti Dino	ICRANet and Università di Roma "Sapienza"
• Chakrabarti Sandip K.	Center for Space Physics, India
• Chardonnet Pascal	Université de la Savoie, France and ICRANet
• Chen Pisin	National Taiwan University Kavli Instit. Particle Astrophysics and Cosmology
• 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	Shanghai Astronomy Observatory
• Lee Hyun Kyu	Department of Physics, Hanyang University
• Lee Hyung Won	School of Computer Aided Science,Ingje, Korea
• Limongi Marco	INAF, Rome, Italy
• Lou You Qing	Tsinghua University, Beijing
• Mester John	Stanford University, USA
• Mignard François	Observatoire de la Côte d'Azur, Nice, France
• Montani Giovanni	ENEA and ICRANet
• Nagar Alessandro	Politecnico di Torino and IHES, Bures sur Yvette, 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, Columbia
- Song Doo Jong — National Institute of Astronomy Korea
- Starobinsky Alexei — Landau Institute for Theoretical Physics, Russia
- Sung-Won Kim — Institute of Theoretical Physics for Asia-Pacific, Korea
- Vissani Francesco — Gran Sasso National Laboratory, Italy
- Wiltshire David — University of Canterbury, New Zealand

Research Scientists

• Benini Riccardo	ICRANet and Università di Roma “Sapienza”, Italy
• 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
• Cianfrani Francesco	ICRANet and Università di Roma “Sapienza”, 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
• Rueda Jorge A.	ICRANet and Università di Roma “Sapienza”, Italy

Short-Term Visiting Scientists

• Ahmedov Bobomurat	Uzbekistan Academy of Sciences
• Ansoldi Stefano	University of Udine
• Boshkayev Kuantay	Al-Farabi Kazakh National University, Almaty, Kazakhstan
• Manchester Richard	Australia Telescope National Facility, CSIRO
• Nagataki Shigehiro	YITP, Kyoto University
• Qadir Asgar	National University Of Sciences And Technology, Pakistan

Long-Term Visiting Scientists

• Arkhangelskaja Irene	Moscow Engineering Physics Institute
• Fimin Nicolaj	Keldysh Institute for Applied Mathematics, Moscow
• Gadri Mohamed	University of Tripoli, Libya
• Goulart Erico	Centro Brasileiro de Pesquisas Físicas, Brazil
• Hoang Ngoc- Long	IPE, Hanoi, Vietnam
• Mosquera Cuesta Herman	Centro Brasileiro de Pesquisas Físicas, Brazil
• Torres Sergio	Centro Internacional de Fisica, Bogotà, Colombia
• Zalaletdinov Roustam	Dept. of Theoretical Physics, Institute of Nuclear Physics Uzbek Academy of Sciences, Uzbekistan

International Relativistic Astrophysics Ph. D.

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 Brazil
- Minazzoli Olivier Switzerland
- Patricelli Barbara Italy
- Rangel Lemos Luis Juracy Brazil
- Rueda Hernandez Jorge Armando Columbia

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
- Ferrari Francesca Italy
- Han Wen-Biao China
- Luongo Orlando Italy
- Pandolfi Stefania Italy
- Siutsou Ivan Belarus
- Taj Safia Pakistan

Eighth Cycle 2009-2012

- Boshkayev Kuantay Kazakhstan
- Bravetti Alessandro Italy
- Ejlli Damian Albanian
- Fermani Paolo Italian
- Haney Maria German
- Menegoni Eloisa Italy
- Sahakyan Narek Armenia
- Saini Sahil Indian

Administrative Staff

• Adamo Cristina	Administrative Office
• D'Angelo Veronica	Head of the Administrative Office
• Del Beato Annapia	Documentation Office
• Di Berardino Federica	Head of the Secretarial Office
• Latorre Silvia	Administrative Office
• Regi Massimo	System Manager

ICRANet Faculty Staff

Belinski Vladimir

Position: ICRANet, Faculty Member

Period covered:1990 - 2007 (INFN)

2007– present (ICRANet)

I Scientific Work

Cosmology: The study of the general solution of gravitational equations with cosmological singularity of an oscillatory chaotic structure (the so-called BKL singularity). Investigation of the properties of this solution and of the influence of different kinds of matter on its character.

Astrophysics: Construction of exact solutions for the motions of gravitating shells and its intersections. Chaotic behaviour of the intersecting shells. Applications to the stellar clusters.

Exact solutions of Einstein and Einstein-Maxwell equations: the theory of gravitational solitons and the mathematical aspects of the Inverse Scattering Method in General Relativity. Constructions of the exact solutions of physical interest.

Quantum Fields: Analysis of the behaviour of the Quantum Fields in Black Hole space-time and in accelerated systems from the point of view of canonical and algebraic Quantum field Theory.

II Conferences and educational activity

The 10^{th} Italian Conference on General Relativity and Gravitational Physics, Bardonecchia, Italy, September 1-5, 1992. Invited Talk “Gravitational Topological Charge and Gravibreather”. Proceedings ed. M.Cerdonio et al., page 37, World Scientific, (1994).

International Conference “Birth of the Universe and Fundamental Physics”, Rome, May 1994. Invited talk “Gravitational Topological Charge”. Lectures Notes in Physics, vol. 455, ed. F. Ochionero, Springer, (1995).

The Seventh Marcel Grossman Meeting (MG7), Stanford, USA, July 24-30, 1994. Chairman of the “Exact solutions” parallel session. Two talks: (i) Plenary talk “Gravitational Topological Charge and the Gravibreather” and (ii) parallel session talk "On the existence of black hole evaporation".

The Eighth Marcel Grossman Meeting (MG8), Jerusalem, Israel, June 22-27, 1997. . Chairman of the “Quantum Fields in Curved Space Time” parallel session. Two parallel sessions talks: “On the turbulence near cosmological singularity” (together with A.Kirillov and G.Montani) and “On the theory of the Unruh effect” (together with B.Karnakov, V.Mur and N.Narozhny).

The Third ICRANet Workshop "Electrodynamics and Magnetodynamics around Black Holes",Rome-Pescara, July 12-24, 1999. The talk "Quantum Field in Rindler space" (together with N..Narozhny, A.Fedotov, B.Karnakov and V.Mur).

International European Conference "Journées Relativistes 99", Weimar, Germany, September 12-17. Plenary talk: "Quantum Fields in Accelerated Frames" (together with N. Narozhny, A. Fedotov, B Karnakov and V. Mur), Ann. Phys. (Leipzig), vol.9 p. 199 (2000).

The Second ICRA Network Workshop "The Chaotic Universe", Rome-Pescara, February 1-5, 1999. The talk "Chaos in Cosmology".

The Third ICRANet Workshop "Electrodynamics and Magnetodynamics around Black Holes", Rome- Pescara, July 12-24, 1999. The talk: "Quantum Field in Rindler space" (together with N. Narozhny, A. Fedotov, B Karnakov and V. Mur)

The Ninth Marcel Grossman Meeting (MG9), Rome, July 2-8, 2000. Chairman of the "Quantum Fields" parallel session.

The Tenth Marcel Grossman Meeting (MG10), Rio de Janeiro, July 20-26, 2003. Chairman of the "Quantum Fields" parallel session.

The 8th Italian-Korean Symposium on Relativistic Astrophysics, Rome-Pescara, August 18-23, 2003. The talk "Boundary conditions in the Unruh problem"

The 1st Italian-Sino Workshop on Cosmology and Relativistic Astrophysics, Rome-Pescara, July 7-17, 2004. The talk on the chaotic motion of the gravitating shells.

The 2nd Italian-Sino Workshop on Relativistic Astrophysics, Pescara, June 10-20, 2005. The talk "On the equilibrium state for two charged masses in General Relativity".

The 9th Italian-Korean Symposium on Relativistic Astrophysics, Seoul, July 19-24, 2005. Invited talk "On the equilibrium state for two charged masses in General Relativity".

The Bego Scientific Recontres, Nice, February 6-17, 2006. Three invited lectures on the black hole evaporation phenomenon.

The 3rd Italian-Sino Workshop on Relativistic Astrophysics, Pescara, June 10-20, 2006. The talk "Equilibrium configuration of two charged masses in general Relativity" (together with G. Alekseev).

The 1st Stueckelberg Workshop on Relativistic Field Theories, Pescara, June 25-July 1, 2006. The talk "New developments in Einstein-Maxwell Theory: non-perturbative approach".

Eleventh Marcel Grossman Meeting (MG11), Berlin, July 23-29, 2006. Chairman of the "Quantum Fields" parallel session. Invited review paper for Proceedings: G. Alekseev and V. Belinski "Superposition of Fileds of two Reissner-Nordstrom Sources".

XII Brazilian School in Gravitation and Cosmology, Rio de Janeiro, September 2006. Five invited lectures under the title "Quantum fields in black hole spacetime and in accelerated systems".

Workshop “Key Problems in Theoretical Cosmology”, April 23-28, 2007, Cargese, Institut D’Etudes Scientifiques De Cargese. Invited talk on the exact solution for the equilibrium configuration of two static Reissner-Nordstrom sources (together with G. Alekseev).

The 10th Italian-Korean Symposium on Relativistic Astrophysics, Pescara, June 25-30, 2007. Talk on the static equilibrium state of two Reissner-Nordstrom sources (together with G. Alekseev)

The 4th Italian-Sino Workshop on Relativistic Astrophysics, Pescara, July 20-30, 2007. Talk on the electric force lines in the equilibrium configuration of two Reissner-Nordstrom sources (together with G. Alekseev, A. Paolino and M.Pizzi).

The 5th Sino-Italian Workshop on Relativistic Astrophysics, Taiwna, May 28-June 1, 2008. talk “Charged membrane as a source for repulsive gravity”.

The 3rd Stueckelberg Workshop on relativistic Astrophysics, Pescara, 8-18 July, 2008. The talk “Charged Masses and repulsive Gravity” (together with M. Pizzi and A. Paolino).

XIII Brazilian School in Gravitation and Cosmology, Rio de Janeiro, July 20-August 1, 2008. Five invited lectures under the title “Einstein.Maxwell solitons”.

International conference in honor of Ya. B. Zeldovich 95th Anniversary, Minsk, Belarus, April 2009. Invited talk “Cosmological singularity”

Twelfth Marcel Grossman Meeting (MG12), Paris, July 12-18, 2009. Chairman of the “Quantum Fields” parallel session.

Work With Students and Diploma thesis supervision:

1. G.Montani (University Graduation, 1992)
2. W. Inglese (University Graduation, 1992)
3. A.D’Aquino (University Graduation, 1993)
4. F.Ferrante (University Graduation, 1996)
5. G.Montani (PhD degree, 1997)
6. M.Talevi (University Graduation, 1997)
7. A.Paolino (University Graduation, 1997)
8. A.Borreli (PhD degree, 1998)
9. D.Oriti (University Graduation, 1999)
10. M.Vella (University Graduation, 2000)
11. D.Colosi (University Graduation, 2000)
12. F.Briscese (University Graduation, 2003)
13. M.Pizzi (University Graduation, 2005)
14. M.Pizzi (PhD degree, 2008)
15. A.Paolino (PhD degree, 2009)

Other teaching activity:

The course of lectures in Cosmology for the PhD students delivered in Physics Department, Rome University “La Sapienza” during 1990-1998.

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

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.

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.

- Students of the First three years degree Thesis (“Tesi di Laurea triennale”) in Physics at University “La Sapienza”, Rome, Italy: Eliana La Francesca, Francesco Alessando Massucci.
- 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.

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.

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.

2009 List of Publications

R. Ruffini, A.G. Aksenov, M.G. Bernardini, C.L. Bianco, L. Caito, M.G. Dainotti, G. De Barros, R. Guida, G. Vereshchagin, S.-S. Xue; The canonical Gamma-Ray Bursts: long, "fake"-"disguised" and "genuine" short bursts; in PROBING STELLAR POPULATIONS OUT TO THE DISTANT UNIVERSE: CEFALU 2008, Proceedings of the International Conference; Cefalù (Italy), September 2008, G. Giobbi, A. Tornambe, G. Raimondo, M. Limongi, L. A. Antonelli, N. Menci, E. Brocato, Editors; AIP Conference Proceedings, 1111, 325 (2009).

M.G. Bernardini, M.G. Dainotti, C.L. Bianco, L. Caito, R. Guida, R. Ruffini; Prompt emission and X-ray flares: the case of GRB 060607 A; in PROBING STELLAR POPULATIONS OUT TO THE DISTANT UNIVERSE: CEFALU 2008, Proceedings of the International Conference; Cefalù (Italy), September 2008, G. Giobbi, A. Tornambe, G. Raimondo, M. Limongi, L. A. Antonelli, N. Menci, E. Brocato, Editors; AIP Conference Proceedings, 1111, 383
(2009).

C.L. Bianco, M.G. Bernardini, L. Caito, M.G. Dainotti, R. Guida, R. Ruffini; The "fireshell" model and the "canonical GRB" scenario. Implications for the Amati relation; in PROBING STELLAR POPULATIONS OUT TO THE DISTANT UNIVERSE: CEFALU 2008, Proceedings of the International Conference; Cefalù (Italy), September 2008, G. Giobbi, A. Tornambe, G. Raimondo, M. Limongi, L. A. Antonelli, N. Menci, E. Brocato, Editors; AIP Conference Proceedings, 1111, 587 (2009).

R. Ruffini, A.G. Aksenov, M.G. Bernardini, C.L. Bianco, L. Caito, P. Chardonnet, M.G. Dainotti, G. De Barros, R. Guida, L. Izzo, B. Patricelli, L.J. Rangel Lemos, M. Rotondo, J.A. Rueda Hernandez, G. Vereshchagin, S.-S. Xue; The Blackholic energy and the canonical Gamma-Ray Burst IV: the "long", "genuine short" and "fake – disguised short" GRBs; in Proceedings of the XIIIth Brazilian School on Cosmology and Gravitation, Mangaratiba, Rio de Janeiro (Brazil), July-August 2008, M. Novello, S.E. Perez Bergliaffa, Editors; AIP Conference Proceedings, 1132, 199 (2009).

L. Caito, M.G. Bernardini, C.L. Bianco, M.G. Dainotti, R. Guida, R. Ruffini; GRB060614: a "fake" short GRB from a merging binary system; Astronomy & Astrophysics, 498, 501 (2009).

Ruffini Remo

Position: Professor at Università “Sapienza” Roma

Director ICRANet

President IRAPh. 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: 2009

Scientific Work

Continued the work on electron-positron plasma kinetics with Alexei Aksenov.

Continued the work on plasma hydrodynamics with Gustavo de Barros.

Finished a review paper coauthored with R. Ruffini and S.-S. Xue, accepted by Physics Report.

Conferences and educational activities

Zeldovich meeting in Minsk, 20-23 April 2009.

6th Italian-Sino Workshop, June 29-July 1, 2009 in Pescara, Italy

12th Marcel Grossmann Meeting, 12-18 July, 2009 in Paris, France

The Shocking Universe, 14-18 September 2009 in Venice, Italy

Work With Students

Gustavo de Barros

Ivan Siutsou

Other Teaching Duties

Worked on the lecture course “Relativistic kinetic theory”

Service activities

Visit to RMKI in Budapest, Hungary, February 2009.

Organized the international conference in honor of Ya. B. Zeldovich 95th Anniversary in Minsk, 20-23 April 2009.

2009 List of Publications

R. Ruffini, G.V. Vereshchagin and S.-S. Xue, "Electron-positron pairs in physics and astrophysics: from heavy nuclei to black holes" Physics Reports, accepted, 2009.

A.G. Aksenov, R. Ruffini and G.V. Vereshchagin, "Thermalization of the mildly relativistic plasma <http://dx.doi.org/10.1103/PhysRevD.79.043008>", Physical Review D, Vol. 79 (2009) 043008.

A. G. Aksenov, R. Ruffini, and G. V. Vereshchagin, "Thermalization of pair plasma with proton loading <http://dx.doi.org/10.1063/1.3141571>" in the Proceedings of "PROBING STELLAR POPULATIONS OUT TO THE DISTANT UNIVERSE" meeting, AIP Conference Proceedings 1111 (2009) 344-350.

Xue She-Sheng

Position: ICRANet Faculty Staff

Period covered: 2009

I Scientific Work

``On the gravitational and electrodynamical stability of nuclear matter core'', submitted to Phys. Rev. C (2009),

``Electron-positron production in non-uniform electric fields'' , Phys. Rev. D 78 (2008) 02501

``Dyadosphere formed in gravitational collapse'', Review article, AIP Conf. Proc. 1059 (2008) 72.

``Electron-positron pairs in physics and astrophysics, from heavy nuclei to black holes'', Phys. Rep. (2009)

``The phase structure of Einstein-Cartan theory'' , Phys. Lett. B665 (2008) 54

``Electron-positron pair production in a marcoscopic object Q/M'', submitted to Phy. Lett. B

``Gravitational instanton and cosmological term'' , Int. Jour. Of Mod. Phys. A24, (2009) 3865.

``Gravitational, electroweak and strong interactions of massive nuclear density cores'', Proceedings Marcel Grossmann meeting (MG12), Paris , World scientific (2009).

II Conferences and educational activities

Conferences and Other External Scientific Work

Presenting talks and posters in international ICRANet meetings:

MG12 Marcel Grossmann meeting (Paris)

1st Xu Guangqi meeting (China)

11th Italian-korean and 6th Italian-Chinese meetings (Korea and Pescara)

3rd Stueckelberg Workshops (Pescara)

5th Italian-Chinese Workshops on Relativistic Astrophysics (Taiwan)

APS April meeting, April 12-15, 2008, Saint Louis , USA

And international Conferences:

"Swift and GRBs: *The Shocking Universe*", in Venice (Italy), Sept 5-9, 2008

Work With the research group of Gamma Ray Bursts :

Maria Grazia Bernardini, Carlo Luciano Bianco, Letizia Caito, G. Vereshchagin, B. Patricelli, G. De Barros, Juracy Luis, L.J. Rangel Lemos

Diploma thesis supervision

IRAP PhD. Faculty, thesis supervision and reading and examination

Jorge Rueda and Juracy Luis, L.J. Rangel Lemos,

Other Teaching Duties

Work With Postdocs

M. Rotondo

Work With the Director R. Ruffini and External Professors

V.S. Popov, H. Kleinert, Pascal Chardonnet

III Service activities

Within ICRANet

Participating organization of ICRANet meetings: the 11th Italian-Korean meeting and 5th and 6th Italian-Chinese meeting and Stuekelberg Workshops on Cosmology and Relativistic Astrophysics

Editor of two conference proceedings 5th Italian-Chinese meeting on Cosmology and Relativistic Astrophysics'', published by American Institute of Physics, and 1st galileo –Xu Guangqi meeting.

Participating organization of 1st Galileo - Xu Guangqi Meeting, October 26-30, 2009 Shanghai - CHINA

Participating organization of ICRANet Seminars

Outside ICRANet

External Professor of Chinese Academy and University

2009 List of Publications

Remo Ruffini, Gregory Vereshchagin , She-Sheng Xue , ``Electron-positron pairs in physics and astrophysics from heavy nuclei to black hole", Phys. Report (in press) 2009

She-Sheng Xue, ``Gravitational Instanton and Cosmological Term", International Journal of Modern physics A, vol 24 (2009) 3865.

Adjunct Professors of the Faculty

Aharonian Felix A.

Positions: Professor
and
Head of the Astroparticle Physics Group
Dublin Institute for Advanced Studies
and
Head of High Energy Astroph. Theory Group,
Max-Planck-Institut fuer Kernphysik,
Heidelberg, Germany

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

I Scientific Work

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)
Scientific Advisor of the High Energy Astrophysics Laboratory, Yerevan, Armenia
Adjunct Professor, School of Physics, University College Dublin (USD)
Adjunct Professor and member of the International Center for Relativistic Astrophysics, Rome/Pescara, Italy
Member ("Supervisor") of the Heidelberg Graduate School of Fundamental Physics,
Member of the International Review Board of the Helmholtz Association
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 (2008-2009)
- three MPG postdoctoral fellows (MPIK/Heidelberg)
- Alexander von Humboldt fellow (MPIK/Heidelnerg)
- three Marie Curie postdoctoral fellows (DIAS/Dublin, and MPIK/Heidelberg)
- two LEA postdoctoral fellows (MPIK/Heidelberg)
- two Schroedinger postdoctoral fellows (DIAS, Dublin)
- an IRCSET postdoctoral fellow (DIAS, Dublin)
- three PhD student in Heidelberg and three PhD students in Dublin

Lectures:
High Energy Phenomena on Galactic and Extragalactic Scales,
Nagoya University Winter School, Japan, February 2009

Gamma Ray Astronomy

DPG School on Astroparticle Physics, Bad Honnef, Germany, Sep 2009

Frontiers in High Energy Astrophysics,
27th Jerusalem Winter School in Theoretical Physics, Jerusalem, Israel, Dec 2009

Organization of International Workshops, Symposia, Conferences (2009)
2009: Co-Chair of OC of the International workshop on High Energy Gamma Rays and Neutrinos from Extragalactic sources, Heidelberg, January 2009

Convener of the Session on "Gamma Rays from AGN", 12th Marcel Grossmann Meeting on Relativistic Astrophysics, Paris, France, July 2009

Convener of the Session on "Neutrino Sources", 4th VLVT workshop, Athens, October, 2009

Member of Scientific Organizing Committees of meetings (2009):
Thirty Years of Magnetars: New Frontiers (Aspen, USA, Feb 2009)
International Conference in honor of Ya. B. Zeldovich 95th anniversary (Minsk, Belarus, April 2009)
RICAP'09: Roma International Conference on Astroparticle Physics (Villa Mondragone, Frascati, Italy, May 2009)
Testing Astroparticle with New GeV/TeV observations (Paris, France, May 2009)
TeV Particle Astrophysics V (Stanford University, USA, Aug 2008)
The Extreme sky: Sampling the Universe above 10 keV (Otranto, Italy,Oct 2009)
High Energy Phenomena in Relativistic Outflows II (Buenos Aires, Argentina, Oct 2009)

2009 List of Publications
(approximately 300 papers in peer review journals - see http://www.mpi-hd.mpg.de/astrophysik/HEA/1024.html)

M. Chernyakova, A. Neronov, F. Aharonian, Y. Uchiyama, T. Takahashi: X-ray observations of PSR B1259-63 near the 2007 periastron passage *Mon. Not. of Royal Astron. Soc.*, 2009, vol. 397, pp. 2123-2132

Y. Fukui, N. Furukawa, T. M. Dame, J. Dawson, H. Yamamoto, G. Rowell, F. Aharonian, W. Hofmann, E. de Ona Wilhelmi, T. Minamidani, A. Kawamura, N. Mizuno, T. Onishi, A. Mizuno, S.Nagataki: A Peculiar Jet and Arc of Molecular Gas toward the Rich and Young Stellar Cluster Westerlund 2 and a TeV Gamma Ray Source. *PASJ*, 2009, vol.61, pp. L23-L26

S. Gabici, F. Aharonian, S. Casanova: Broad-band non-thermal emission from Molecular clouds illuminated by cosmic rays from nearby supernova remnants M*on. Not. of Royal Astron. Soc.*, 2009, vol. 396, pp. 1629-1639

T. Takahashi, T. Kishishita, Y. Uchiyama, T. Tanaka, K. Yamaoka, D. Khangulyan, F.Aharonian, V. Bosch-Ramon, J. Hinton: Study of the Spectral and Temporal Characteristics of X-Ray Emission of the Gamma-Ray Binary LS 5039 with Suzaku. *Astrophys. J* 2009, vol. 697, pp. 592-600

A. Taylor, F.A. Aharonian: The Spectral Shape and Photon Fraction as Signatures of the GZK-

Cutoff. P*hys. Rev D,* 2009, vol. 79, id. 083010

A. Taylor, S. Gabici, R. White, S. Casanova, F. Aharonian: Revisiting the diffuse neutrino flux from the inner Galaxy using new constraints from very high energy gamma-ray observations. *Nucl. Inst. and Methods in Phys. Research,* 2009, vol. 602, pp. 113-116

G. Vannoni, S. Gabici, S.; F.A. Aharonia: Diffusive shock acceleration in radiation-dominated environments, *Astron. Astrophys.,* 2009, vol. 497, pp.17-26

L. O'C. Drury, F.A. Aharonian, D. Malyshev, S. Gabici: On the plasma temperature in supernova remnants with cosmic-ray modified shocks, *Astron. Astrophys.*, 2009, vol. 496, pp.1-6

J.A. Hinton, J.L. Skilton, S. Funk, J. Brucker, F.A. Aharonian, G. Dubus, A. Fiasson, Y. Gallant, W. Hofmann, A. Marcowith: HESS J0632+057: A New Gamma-Ray Binary? *Astrophys. J.*, 2009, vol. 690, pp. L101-L104

A. Eungwanichayapant, F. Aharonian: Very High Energy Gamma Rays from electron-positron Pair Halos.*International Journal of Modern Physics D,* 2009, vol. 18, pp. 911- 927

HESS collaboration papers: F.A. Aharonian et al.

Spectrum and variability of the Galactic center VHE gamma-ray source HESS J1745-290. *Astron. Astrophys*., 2009, vol. 503, pp.817-825

Simultaneous multiwavelength observations of the second exceptional gamma-Ray flare of PKS 2155-304 in July 2006. *Astron. Astrophys*., 2009, vol. 502, pp.749-770 502

Constraints on the multi-TeV particle population in the Coma galaxy cluster with HESS observations. *Astron. Astrophys*., 2009, vol. 502, 437-443

Detection of very high energy radiation from HESS J1908+063 confrms the Milagro unidentifieded source MGRO J1908+06. *Astron. Astrophys*., 2009, vol. 499, 723-728.

Simultaneous Observations of PKS 2155304 with HESS, Fermi, RXTE, and Atom: Spectral Energy Distributions and Variability in a Low State *Astrophys.J.*, 2009, vol. 696, L150-L155

Upper limit on the very high energy -ray emission from the globular cluster 47 Tucanae. *Astron. Astrophys.*, 2009, vol. 499, 273-277

Discovery of Very High Energy Gamma-Ray Emission from Centaurus a with H.E.S.S. *Astrophys. J*., 2009, vol. 695, L40-L44

Discovery of Gamma-Ray Emission From the Shell-Type Supernova Remnant RCW 86 with HESS. *Astrophys.J*., 2009, vol. 692, 1500-1505

HESS observations of gamma-ray bursts in 2003-2007. *Astron. Astrophys*., 2009, vol. 495, 505-512

Very high energy gamma-ray observations of the galaxy clusters Abell 496 and Abell 85 with HESS. *Astron. and Astrophys*., 2009, vol. 495, 27-35

A Search for a Dark Matter Annihilation Signal Toward the Canis Major with HESS. *Astrophys.J*.,

2009, vol. 691, 175-181

HESS Observations of the Prompt and Afterglow Phases of GRB 060602B *Astrophys. J.*, 2009, vol. 690, 1068-1073

F.A. Aharonian, “Motivations and Objectives of VHE Gamma Ray Astronomy”,
Physics Reports, to be submitted

F.A. Aharonian, W. Hofmann, S. Ritz “High-Energy Gamma-Ray Astronomy”,
Annual Review of Nuclear and Particle Science, in preparation

Recent articles for broad audience:
F.A. Aharonian, “The Very-High-Energy Gamma Ray Sky", Science, 2007, 315, 70
F.A. Aharonian, “High Energy Astrophysics", UNESCO Encyclopedia, 2009
F.A. Aharonian and M. Chernyakova “Gamma Asronomiya” (in Russian) Zemlya i Vselennaya, March 2009

Books:
F. A. Aharonian and S.R. Kelner “Radiation Processes in High Energy Astrophysics", Oxford University Press, in preparation

F. A. Aharonian "Very high energy cosmic gamma radiation : a crucial window on the extreme Universe", World Scientific Publishing, second edition, in preparation

Conference Proceedings:
F.A. Aharonian, W. Hofmann, F. Rieger (editors): “High Energy Gamma Ray Astronomy-3”, AIP Conf. Proc. 1085, Melville, New York, 2009

E. Resconi, F.A. Aharonian (editors): “"High-Energy Neutrinos from Extragalactic sources", International Journal of Modern Physics, in preparation

Amati Lorenzo

Position: ICRANet external collaborator (researcher at INAF, Bologna)

Period covered:

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 2009 we concentrated on the physical explanation of the Ep,i – Eiso ("Amati") correlation, the identification and interpretation of "disguised" short GRBs, based also on their location and evolution in the Ep,i – Eiso plane, the synthesis of prompt emission spectra, with particular emphasis on the explanation of the soft X-ray spectral data.

Besides my collaboration with ICRANet, my main scientific activity includes: spectral, timing and correlation properties of GRBs, investigation of the cosmological use of GRBs, study of the scientific case and concept design of GRB detectors for future missions, X-ray spectral and timing properties of X-ray binaries.

II Conferences and educational activities

Conferences and Other External Scientific Work

September 2009 The Shocking Universe
Venice, Italy
(*Solicited oral presentation*)

July 2009 Twelfth Marcel Grossmann Meeting
Paris, France
(*Invited oral presentation*)

June 2009 6th Italian-Sino Workshop on Relativistic Astrophysics
Pescara, Italy
(*oral presentation*)

May 2009 Frascati Workshop 2009: Multifrequency Behaviour of High Energy Cosmic Sources
Vulcano (ME), Italy
(*Invited oral presentation*)

May 2009 53rd Meeting of the Italian Astronomical Society (SAIT)

Pisa, Italy
(*oral presentation*)

February 2009 44th Rencontres de Moriond - Very High Energy Phenomena in the Universe
La Thuile, Italy
(*invited oral presentation*)

Work With Students

Discussions and joint data analysis of GRBs with some of the ICRANet IRAP Ph.D. students (e.g., collaboration with L. Caito on GRB 071227 and G. Barros on GRB 050509B).

III Service activities

Within ICRANet

- Member of the International Scientific Advisory Committee of the 1st Galileo - Guangqui

- 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, JCAP, …)

2009 list of Publications

Refereed

L. Amati, F. Frontera, C. Guidorzi, 2009, " Extremely energetic Fermi Gamma-Ray Bursts obey spectral energy correlations " , Astronomy & Astrophysics, in press

L. Amati, 2009, " The correlation between peak photon energy and radiated energy in Gamma--Ray Bursts " , Journal of the Korean Physical Society, in press

L. A. Antonelli, P. D.Avanzo, R. Perna, L. Amati, S. Covino, S. Cutini, V. D.Elia, S. Gallozzi, A. Grazian, E. Palazzi, S. Piranomonte, A. Rossi, S. Spiro, L. Stella, V. Testa, G. Chincarini, A. Di Paola, D. Fugazza, E. Giallongo, E. Maiorano, N. Masetti, F. Pedichini, R. Salvaterra, G. Tagliaferri, S. Vergani 2009, " GRB090426: the farthest short gamma-ray burst? " , Astronomy & Astrophysics, 547, L45

R. Salvaterra, M. Della Valle, S. Campana, G. Chincarini, S. Covino, P. D'Avanzo, A. Fern.andez-Soto, C. Guidorzi, F. Mannucci, R. Margutti, C.C. Thone, L.A. Antonelli, S.D. Barthelmy, M. De Pasquale, V. D'Elia, F. Fiore, D. Fugazza, L.K. Hunt, E. Maiorano, S. Marinoni, F.E. Marshall, E. Molinari, J. Nousek, E. Pian, J.L. Racusin, L. Stella, L. Amati, et al. 2009, " GRB 090423 at a redshift of z approximately 8.1 " , Nature, 461, 1258

E. Branchini, E. Ursino, A. Corsi, D. Martizzi, L. Amati, J.W. den Herder, M. Galeazzi, B. Gendre, J. Kaastra, L. Moscardini, F. Nicastro, T. Ohashi, F. Paerels, L. Piro, M. Roncarelli, Y. Takei, M. Viel, 2009, " Studying the WHIM with Gamma Ray Bursts " , The Astrophysical Journal, 697, 328

P. Ferrero, S. Klose, D. A. Kann, S. Savaglio, E. Palazzi, E. Maiorano, P. Böhm, S. Schulze, D. Grupe, S. R. Oates, S. F. Sánchez, L. Amati, et al., 2009, " Analysing afterglows using integral field spectroscopy: GRB 060605, the first practical example " , Astronomy & Astrophysics, 497, 729

F. Frontera, C. Guidorzi, E. Montanari, F. Rossi, E. Costa, M. Feroci, F. Calura, M. Rapisarda,L. Amati, D. Carturan, M. R. Cinti, D. Dal Fiume, L. Nicastro, M. Orlandini, 2009, " The Gamma-Ray Burst catalog obtained with the Gamma Ray Burst Monitor Aboard BeppoSAX " , The Astrophysical Journal Supplement, 180, 192

L. Piro, J.W. den Herder, T. Ohashi, L. Amati, et al., 2009, " EDGE: Explorer of diffuse emission and gamma-ray burst explosions " , Experimental Astronomy, 23, 69

L. Amati, C. Guidorzi, F. Frontera, M. Della Valle, F. Finelli, R. Landi, E. montanari, 2008, " Measuring the cosmological parameters with the Ep,i-Eiso correlation of Gamma-Ray Bursts " , Monthly Notices of the Royal Astronomical Society, 391, 577

Conference proceedings

M. Feroci, L. Amati, Antonelli, L. A.; Bonvicini, V.; Campana, R.; Costa, E.; Del Monte, E.; Donnarumma, I.; Evangelista, Y.; Fiore, F., et al., 2009, " A Light and Effective Wide Field Monitor for Gamma Ray Bursts and Transient Sources " , AIP Conference Proceedings, Volume 1133, pp. 49-51

L. Amati, 2009, " Gamma-ray bursts as cosmological probes " , Memorie della Societa Astronomica Italiana, v.80, p.207

L. Amati, 2009, " Measuring cosmological parameters with Gamma-Ray Bursts " , EAS Publications Series, Volume 36, 2009, pp.25-29

Chechetkin Valeri

Position:
Main scientist, professor of Keldysh Institute of Applied Mathematics RAS
Period covered: 1968-present

Main scientist of Institute of Physics of Stochastic Problem of RNC “Kurchatov Institute”
Period covered: 2006-present

Professor M I PH U , Moscow, Russia
Period covered: 1998-present

I Scientific Work

Fluid Dynamics:

The Raleigh-Taylor instability and other hydrodynamic instabilities, Turbulence, Shocks, Explosions;

Combustion:

Turbulent flames, Detonation, Flame ignition;

Nonlinear Physics:

Front propagation, Instabilities, Fractals;

Electrodynamics and Plasma Physics:

Plasma instabilities, Magnetohydrodynamics;

Astrophysics:

Supernova events, Thermonuclear explosions, White dwarfs, Jets, Nucleosynthesis, Neutron Stars, Accretion Discs, Black Holes, High-Particles in Astrophysics.

Leader in 6 successful projects

II Conferences and educational activities

Conferences and Other External Scientific Work

1. Gamow Summer School “Astronomy and beyond: Astrophysics, Cosmology, Radioastronomy, High Energy Physics and Astrobiology”,17-23 August, 2009, Odessa, Ukraine

2. Japan-Russia Symposium on “Numerical Experiment in Hydrodynamical Instability and Turbulence with High-Performance Computing, Moscow 10-13 November, 2009, Russia

3. An international conference "Nonstationary Phenomena and Instabilities in Astrophysics" September 08-11 2009 , Volgograd, Russia.

Diploma thesis supervision

2 in 2009

2009 List of Publications

Books and monographs 4

Last book “The physical foundations of fluidodynamics:

Macroscopic and kinetic approaches”, Moscow 2007, pp1-212

Articles in refereed journals 220

1. Fimin, N. N.; Chechetkin, V. M., “The collapse of matter and the formation of black holes. Conceptual aspects”, Astronomy Reports, Volume 53, Issue 9, pp.824-838, 2009

2. Chechetkin, V. M.; D'Yachenko, V. F.; Ginzburg, S. L.; Paleichik, V. V.; Fimin, N. N.; Sudarikov, A. L., “On the generation mechanism of hard cosmic gamma-ray emission from AGN jets”, Astronomy Reports, Volume 53, Issue 6, pp.501-509, 2009

3. Galanin, M. P.; Lukin, V. V.; Chechetkin, V. M., “Mathematical modeling of a jet in the vicinity of a compact object”, Astronomy Reports, Volume 53, Issue 4, pp.295-309, 2009

4. Belotserkovskii, O. M.; Denisenko, V. V.; Konyukhov, A. V.; Oparin, A. M.; Troshkin, O. V.; Chechetkin, V. M.,” Numerical stability analysis of the Taylor-Couette flow in the two-dimensional case”, Computational Mathematics and Mathematical Physics, Volume 49, Issue 4, pp.729-742, 2009

5. Pascal Chardonnet · Valery Chechetkin · Lev Titarchuk, “On the pair-instability supernovae and gamma-ray burst phenomenon”, Astrophys Space Sci.,2009

Invited papers in books 12

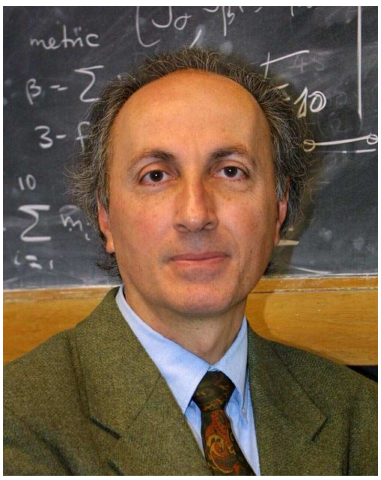
2008-2009

1. Vereshchagin, Gregory; Chechetkin, V. M.; Dyachenko, V. F.; Ginzburg, S. L.; Fimin, N. N.; Ruffini, Remo; Siutsou, Ivan, “On kinetic instabilities in collisionless ultra-relativistic streaming cold electron-proton plasma”, American Physical Society, 2009 APS April Meeting, May 2-5, 2009

2. V. M. Chechetkin, V. Bychkov and I. V. Baikov, “Neutrino radiation on early stage of

Collapse", Conference Proceedings Vol. 98 "Frontier Objects in Astrophysics and Particle Physics"F. Giovannelli and G. Mannocchi (Eds.)SIF, Bologna, 2009

Damour Thibault



Position: Professeur Permanent
Institut des Hautes Etudes Scientifiques.

Period covered: 1989-present

Conferences and educational activities

Mai 2009: Cosmological Frontiers in Fundamental Physics, Workshop of the International Solvay Institutes, Bruxelles (Belgique).

Juillet 2009: 12 th Marcel Grossmann Meeting, Paris (France).

Septembre 2009: Challenges in Theoretical Cosmology, Conference of the Tufts Institute of Cosmology, Talloires (France).

ICRANET-related Collaborations with

Alessandro NAGAR
Orchidea LECIAN

2009 List of publications (T. Damour, A. Nagar and O.M. Lecian)

1. On the gravitational polarizability of black holes.
   Thibault Damour, (IHES, Bures-sur-Yvette) , Orchidea Maria Lecian, (IHES, Bures-sur-Yvette & APC, Paris & Rome U. & ICRA, Rome) . IHES-P-09-28, Jun 2009. (Received Jun 2009). 17pp.
   Published in Phys.Rev.D80:044017,2009
   e-Print: arXiv:0906.3003 [gr-qc]

2. The Equivalence Principle and the Constants of Nature.
   Thibault Damour, (IHES, Bures-sur-Yvette) . Jun 2009. 12pp.
   Invited talk at ISSI Workshop on The Nature of Gravity: Confronting Theory and Experiment in Space, Bern, Switzerland, 6-10 Oct 2008.
   Submitted to Space Sci.Rev.
   e-Print: arXiv:0906.3174 [gr-qc]

3. Fermionic Kac-Moody Billiards and Supergravity.
   Thibault Damour, Christian Hillmann, (IHES, Bures-sur-Yvette) . IHES-P-09-31, Jun 2009. 55pp.
   Published in JHEP 0908:100,2009.
   e-Print: arXiv:0906.3116 [hep-th]

4. The Effective One Body description of the Two-Body problem.
   Thibault Damour, (IHES, Bures-sur-Yvette) , Alessandro Nagar, (IHES, Bures-sur-Yvette & INFN, Turin) . Jun 2009. 45pp.
   Lectures given at Orleans School on the Sciences of the Universe: Mass Motion, Orleans, France, 23-25 Jun 2008.
   e-Print: arXiv:0906.1769 [gr-qc]

5. Relativistic tidal properties of neutron stars.
   Thibault Damour, Alessandro Nagar, (IHES, Bures-sur-Yvette & ICRA, Pescara) . Jun 2009. 21pp.
   Submitted to Phys.Rev.D
   e-Print: arXiv:0906.0096 [gr-qc]

6. Gravitational-wave extraction from neutron-star oscillations.
   Sebastiano Bernuzzi, (Parma U. & INFN, Parma & Jena U., TPI) , Luca Baiotti, (Kyoto U., Yukawa Inst., Kyoto) , Giovanni Corvino, (Parma U. & INFN, Parma & Potsdam, Max Planck Inst.) , Roberto De Pietri, (Parma U. & INFN, Parma) , Alessandro Nagar, (IHES, Bures-sur-Yvette & INFN, Turin & ICRA, Pescara) . Feb 2009. 7pp.
   Contributed to 3rd Stueckelberg Workshop on Relativistic Field Theories, Pescara, Italy, 8-18 Jul 2008.
   e-Print: arXiv:0902.2720 [gr-qc]

7. An Improved analytical description of inspiralling and coalescing black-hole binaries.
   Thibault Damour, (IHES, Bures-sur-Yvette & ICRA, Pescara) , Alessandro Nagar, (IHES, Bures-sur-Yvette & ICRA, Pescara & INFN, Turin) . Feb 2009. (Received Apr 15, 2009). 5pp.
   Published in Phys.Rev.D79:081503,2009.
   e-Print: arXiv:0902.0136 [gr-qc]

8. Improved resummation of post-Newtonian multipolar waveforms from circularized compact binaries.
   Thibault Damour, (IHES, Bures-sur-Yvette & ICRA, Pescara) , Bala R. Iyer, (IHES, Bures-sur-Yvette & Raman Research Inst., Bangalore) , Alessandro Nagar, (IHES, Bures-sur-Yvette & ICRA, Pescara & INFN, Turin) . Nov 2008. (Received Mar 15, 2009). 31pp.
   Published in Phys.Rev.D79:064004,2009.
   e-Print: arXiv:0811.2069 [gr-qc]

9. Gravitational-Wave Extraction from Neutron Stars Oscillations: Comparing linear and nonlinear techniques.
   Luca Baiotti, (Tokyo U., Komaba & Potsdam, Max Planck Inst.) , Sebastiano Bernuzzi, (Parma U. & INFN, Parma) , Giovanni Corvino, (Potsdam, Max Planck Inst. & Parma U. & INFN, Parma) , Roberto De Pietri, (Potsdam, Max Planck Inst.) , Alessandro Nagar, (IHES, Bures-sur-Yvette & INFN, Turin & ICRA, Pescara) . Aug 2008. (Received Aug 2008). 27pp.
   Published in Phys.Rev.D79:024002,2009.
   e-Print: arXiv:0808.4002 [gr-qc]

Della Valle Massimo

Position: Director for Research

Istituto Nazionale di Astrofisica-Napoli

Period covered: 1990-2009

I Scientific Work

The research activity spans several fields in the observational Astrophysics:

a) 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

2007. Adjunct Professor at the International Center for Relativistic Astrophysics Network, 65122, Pescara

2008. Director for Research at the Osservatorio Astronomico di Capodimonte, INAF-Napoli

2008-2009. Visiting Scientist at the ESO Telescope Division (on leave of INAF-Napoli)

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

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 11 national and international PhD Schools.

Publications:

Author of 386 scientific papers, 147 referred articles, 137 GCN and IAU telegrams and 102 contributes to International Conferences.

Outreach

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

2009 List of Publications

12. Hakobyan, A. A., Petrosian, A. R., Mamon, G. A et al. 2009, Ap, 52, 40 “Five supernova survey galaxies in the southern hemisphere. I. Optical and near-infrared database”

13. Agnoletto, I., Benetti, S., Cappellaro, E. et al. 2009, ApJ, 691, 1348 “SN 2006gy: Was it Really Extraordinary?”

14. Tanaka, M., Tominaga, N., Nomoto, K. et al. 2009, ApJ, 692, 1131 “Type Ib Supernova 2008D Associated With the Luminous X-Ray Transient 080109: An Energetic Explosion of a Massive Helium Star”

15. D'Elia, V., Fiore, F., Perna, R. et al. 2009, ApJ, 694, 332 “The Prompt, High-Resolution Spectroscopic View of the "Naked-Eye" GRB080319B”

16. D'Avanzo, P., Malesani, D., Covino, S. et al. 2009, A&A, 498, 711 “The optical afterglows and host galaxies of three short/hard gamma-ray bursts”

17. Henze, M., Pietsch, W., Della Valle, M. et al. 2009, A&A, 498, L13 “The very short supersoft X-ray state of the lassical nova M31N 2007-11a”

18. Henze, M., Pietsch, W., Haberl, F. et al. 2009, A&A, 500, 769 “ The first two transient supersoft X-ray sources in M 31 globular clusters and the connection to classical novae”

19. Tanaka, M., Yamanaka, M., Maeda, K. et al. 2009, ApJ, 700, 1680 “Nebular Phase Observations of the Type Ib Supernova 2008D/X-ray Transient 080109: Side-viewed Bipolar Explosion”

20. Taubenberger, S., Valenti, S., Benetti, S. et al. 2009, MNRAS, 397, 677 “Nebular emission-line profiles of Type Ib/c supernovae - probing the ejectaasphericity”

21. Poznanski, D. et al. 2009, Astro2010: The Astronomy and Astrophysics Decadal Survey, Science White Papers, no. 237 “Type II Supernovae as Probes of Cosmology”

22. Howell, D. A.; Conley, A.; Della Valle, M. et al. 2009, “Type Ia supernova science 2010-2020” White paper submitted to the Astro2010 committee

23. Raskin, C., Scannapieco, E., Rhoads, J. Della Valle, M. 2009, ApJ, “Prompt Ia Supernovae Are Significantly Delayed”

24. Salvaterra, R., Della Valle, M., Campana, S. et al. 2009, Nature, 461, 1258, “GRB090423 at a redshift of z~8.1”

25. Della Valle, M. 2009, AIPC, Vol. 1111, p. 393

CURRICULUM VITAE
JAAN EINASTO

Date of birth: February 23, 1929

Place of birth: Tartu, Estonia

Nationality: Estonia

Address: Tartu Observatory, EE-61602 Tõravere, Estonia

Education:

B.S. in astronomy, June 1952, Tartu University
Ph. D. in astronomy, Dec. 1955, Tartu University
Dr. Science in astronomy, March 1972, Tartu University

Employment:

1952 - 1957, research associate, Tartu Observatory,
1957 - 1976, senior research associate, Tartu Observatory,
1976 - 1992, Head, Department of Physics of Galaxies, Tartu Observatory,
1983 - 1995, Head, Division of Astronomy and Physics, Estonian Academy of Sciences,
1992 - 1995, Professor of Cosmology, Tartu University,
1992 - 1997, Head, Department of Cosmology, Tartu Observatory
1998 - senior research associate, Tartu Observatory

Research: structure and kinematics of stellar populations in Galaxy, structure and evolution of galaxies; large-scale distribution of galaxies and clusters of galaxies; dark matter; evolution of the large-scale structure.

Visits to other astronomical institutions: Institute of Astronomy (Cambridge), European Southern Observatory, UCLA, Harvard Center for Astrophysics, Fermilab, Astrophysical Institute Potsdam, Uppsala Astronomical Observatory, NORDITA, ICRAnet

Participation in scientific organizations

International Astronomical Union (1961)
American Astronomical Society (1981)
Estonian Academy of Sciences (1981)
German Astronomical Society (1985)
Academia Europaea (1990)
European Astronomical Society (1990)
Royal Astronomical Society (1994)

Awards: Estonian science prize (1982, 1998, 2003, 2007)
The Order of the National Coat of Arms (1998)
Marcel Grossmann Award (2009)

2009 List of Publications

Einasto, J. 2009a, *Dark Matter*, ArXiv e-prints

Einasto, J. 2009b, *Large scale structure of the Universe*, ArXiv e-prints

Lietzen, H., Hein¨am¨aki, P., Nurmi, P., et al. 2009, *Environments of nearby quasars in Sloan Digital Sky Survey*, A&A, 501, 145

Tempel, E., Einasto, J., Einasto, M., Saar, E., & Tago, E. 2009, *Anatomy of luminosity functions: the 2dFGRS example*,
A&A, 495, 37

Einasto, M., Saar, E., Martinez, V. J., et al. 2008, *Toward Understanding Rich Superclusters*, ApJ, 685, 83

Hein¨am¨aki, P., Nurmi, P., Tago, E., et al. 2008, *Nearby quasars in SDSS*, in Problems of Practical Cosmology, Volume 1, ed. Y. V. Baryshev, I. N. Taganov, & P. Teerikorpi, 123

Nurmi, P., Hein¨am¨aki, P., Niemi, S., et al. 2008, *Galaxy groups in LCDM simulations and SDSS DR6*, in Problems of
Practical Cosmology, Volume 1, ed. Y. V. Baryshev, I. N. Taganov, & P. Teerikorpi, 78

Tago, E., Einasto, J., Saar, E., et al. 2008, *Groups of galaxies in the SDSS Data Release 5. A group-finder and a catalogue*, A&A, 479, 927

Fang Li-Zhi

Position: Professor of Physics and Astronomy

University of Arizona

Period covered: 1992- present

I Scientific Work

In recent years Fang's research focus on non-equilibrium and non-linear problems of cosmology. It includes the turbulence behavior of the mass and velocity fields of cosmic baryon fluid; the radiative transfer of resonant photons in halos around photon sources in the early universe, and the 21 cm signal from the epoch of reionization.

II Conferences and educational activities

Colloquium: Scaling in Cosmology, Institute of Physics, Academia Sinica,
Taipei, May 30, 2007

Invited lectures: 1. the standard cosmological model
2. primordial perturbations
3. nonlinear evolution of intergalactic medium (IGM)
4. probe of dark energy with large scale structures

Taipei School/Workshop on Large Scale Structures of the Universe
National Center for Theoretical Science, May 28 – June 2, 2007

Colloquium: Studying cosmic baryon fluid with cosmological hydrodynamic simulation, Department of Mathematics, State University of New York at Stony Brook, February 20, 2008

Colloquium: Studying cosmic baryon fluid with hydrodynamic simulation, Institute of Physics, Academia Sinica, Taipei, May 27, 2008

Colloquium: 21 cm signals from early universe, Department of Physics, DongHwa University, HuaLien, Taiwan, June 2, 2008

Invited talk: Intermittency of cosmic baryon fluid, 5^{th} meeting on relativistic astrophysics, Taipei, May 28, 2008

Colloquium: A fundamental physical problem in 21 cm cosmology The university of Texas at Arlington, April,1, 2009

Colloquium: The zeroth law of the thermodynamics of photon-atom system and 21 cm cosmology, National Taiwan University, June 16, 2009

Work With Students

1. Ishani Roy: She works with me on A WENO algorithm for radiative transfer with resonant scattering and the Wouthuysen-Field Coupling, New Astronomy}, 14, 513, (2009)

2. Yi Lu: She works with me on Log-Poisson hierarchical clustering of cosmic neutral Hydrogen and Ly-alpha transmitted flux of QSO absorption spectrum, Astrophys. J. 691, 43, (2009)

3. Jian-Mei Qiu: She worked with me on WENO algorithm of radiative transfer equation. Four papers (ApJ, and New Astronomy) have been published. She obtained her PhD degree on 2007.

Diploma thesis supervision

Hu Zhan, obtained his PhD degree
Thesis: The Large-Scale Structure of the Universe in One Dimension.

Teaching Duties

Phys571 (general relativity and cosmology)
Phys195A (creation of the universe)
Phys596F (Cosmology and particle astrophysics)
Phys515 (Electrodynamics)

Work With Postdocs

1. Postdoc: Tong-Jie Zhang (stay in my group from June 1, 2005 - May 31, 2006)
Publications in this period:
1. X-ray emission of baryonic gas in the universe: luminosity-temperature relationship and soft band background, ApJ, 642, 625 (2006)
2. Scaling relation between Sunyaev-Zel'dovich effect and X-ray luminosity and scale-free evolution of cosmic baryon field, New Astronomy, 14, 152, (2009)

2. Postdoc: Ji-Ren Liu (stay in my group from Aug 8 2006 – Dec 2008)
Publications in this period:
1. Is the cosmic UV background fluctuating at redshift z ~6 ? ApJL, 645, 1, (2006)
2. Non-Gaussianity of the cosmic baryon fluid: log-Poisson hierarchy model, Astrophys. J., 672, 11, (2008)
3. Ly-alpha Leaks and Reionization, Mon. Not. R. Astr. Soc., 383, 1459, (2008)

3. Postdoc, Wen Xu (stay in my group from Sep 2008 – March 2009)
Publications in this period:
1. Time evolution of Wouthuysen-Field coupling, Astrophys. J. 694, 1121, (2009)
2. Wouthuysen-Field coupling in 21 cm region around high redshift sources, Astrophys. J., 703, 1992, (2009)

III Service activities

Within ICRANet

Organizing the 4^{th} – 6^{th} Italian-Sino Workshop

Member and Chair of Steering Committee

Outside ICRANet

Editor, International Journal of Modern Physics A (2003 -)
Editor, Modern Physics Letters A (2003 -)

2009 List of Publications

Scaling relation between Sunyaev-Zel'dovich effect and X-ray luminosity and scale-free evolution of cosmic baryon field, Q. Yuan, H.Y. Wan, T.J. Zhang, J.R. Liu, L.L. Feng and L.Z. Fang, New Astronomy, 14, 152

Log-Poisson hierarchical clustering of cosmic neutral hydrogen and Lyα transmitted flux of QSO absorption spectrum, Y. Lu, Y.Q. Chu, and L. Z. Fang, Astrophys. J. 691, 43

Time evolution of Wouthuysen-Field coupling, I. Roy, W. Xu, J.M. Qiu, C.W. Shu and L.Z. Fang, Astrophys. J. 694 1121.

AWENO algorithm for radiative transfer with resonant scattering and theWouthuysen-Field Coupling, I. Roy, J.M. Qiu, C.W. Shu and L.Z. Fang, New Astronomy, 14, 513

Wouthuysen-Field coupling in 21 cm region around high redshift sources, I. Roy, W. Xu, J.-M. Qiu, C.-W. Shu, and L. Z. Fang, Astrophys. J., 703, 1992

The zeroth Law of thermodynamics of photon-hydrogen system and 21 cm cosmology, Li.Z. Fang, Int. J. of Mod. Phys. D, in press

Jantzen Robert

Position: professor, Villanova University

Period covered: Summer 2008 through Summer 2009

I Scientific Work

Collaboration with Donato Bini, Christian Cherubini, Andrea Geralico on mathematical properties of stationary spacetimes, and on the use of the Weyl tensor invariants (specifically the speciality index) as tools for gauge invariant analysis of spatially homogeneous and inhomogeneous dynamics and with Donato Bini, Christian Cherubini and Luigi Stella on the relativistic Poynting-Robertson effect in astrophysics.

II Conferences and educational activities

Conferences and Other External Scientific Work

MG12 ICC chair and program organizer

Other Teaching Duties

Full time teaching in Mathematical Sciences Dept of Villanova University

2009 List of Publications

The general relativistic Poynting-Robertson effect
D. Bini, R.T. Jantzen and L. Stella
Class. Quantum Grav. 26, 055009 (19pp) (2009).

Electrocardiogram of the Mixmaster Universe
D. Bini, A. Geralico, R.T. Jantzen and C. Cherubini
Class. Quantum Grav. 26, 025012 (20pp) (2009).

Kleinert Hagen

Position: Richard Feynman Professor

Period covered: 2009

I Scientific Work

H. Kleinert, *"Path Integrals inQuantumMechanics, Statistics, Polymer Physics,and Financial Markets"*World Scientific, Singapore 2009, pp. 1-1547 H. Kleinert and P. Kienle, *Neutrino Mass Differences from Interfering Recoil Ions*, Lecture presented at the 3rd StueckelbergWorkshop on Relativistic Field Theories ICRANET Stueckelberg July 8-18, 2008 - ICRANet Center, Pescara (Italy), and EJTP 6, 107 (2009)

A. Chervyakov and H. Kleinert, *Exact Pair Production Rate for a Smooth Potential Step* Phys. Rev. D 80, 065010 (2009

P. Jizba,H. Kleinert, and P.Haener *Perturbation Expansion forOption Pricing with Stochastic Volatility* Physica A 388 (2009) 3503-3520

J. Dietel and H. Kleinert, *Modeling two-dimensional crystals and nanotubes with defects under stress* (arXiv:0812.0226) Phys. Rev. B 79, 245415 (2009)

J.Dietel andH. Kleinert, *Lindemann parameters for solidmembranes focused on carbon nanotubes* (arXiv:0806.1656) Phys. Rev. B 79, 075412 (2009)

J. Dietel and H. Kleinert, Phase diagram of vortices in high-Tc superconductors with a melting line in the deep H_{c2} region (arXiv:0807.2757)
Phys. Rev. B 79, 014512 (2009)

H. Kleinert, *Equivalence Principle and Field Quantization in Curved Spacetime* (arxiv.org:0910.4034) EJTP 6, 1 (2009)

II Conferences and educational activities

Conferences and Other External Scientific Work

Minsk 21.4. –23.4.
http://www.icranet.org/images/stories/Meetings/ZM/poster.jpg

Dresden 18.5.-20.5.
http://www.mpipks-dresden.mpg.de/~enrage09/

Timisoara 21.5.-24.5.

Dr. h.c. celebration
http://users.physik.fu-berlin.de/~kleinert/BITMAPS/Kleinert_with_Academic_Senate_of_West_University_of_Timisoara.jpg

Pescara 27.7—31.7.

Luminy 27.9.—30.9.
http://www.math.unipd.it/~luminy09/

Berlin 5.10.—9.20
https://indico.desy.de/conferenceDisplay.py?confId=1766

Work With Students

• Tim X.J. Chen (FU-Berlin, Germany)
• Konstantin Glaum (FU-Berlin, Germany)
• Sonja Overesch (FU-Berlin, Germany)
• Walja Korolevski (FU-Berlin, Germany)
• Mathias Ohlinger (FU-Berlin, Germany)
• Moritz Sch ¨ utte (FU-Berlin, Germany)
• Steffen R¨othel (FU-Berlin, Germany)
• Matthias Ohliger (FU-Berlin, Germany)
• Pascal Mattern (FU-Berlin, Germany)1469
• Ednilson Santos (FU-Berlin, Germany)
• Alexander Hoffmann (FU-Berlin, Germany)
• Parvis Soltan-Panahi: Thermodynamic Properties of F=1 Spinor Bose-Einstein Condensates; (2006)
• Markus Dttmann: Variational Methods in Disorder Problems – Testing Approximation Techniques with and without Replicas on a Zero-Dimensional Disorder Model; (2009)
• Oliver Gabel: Non-Equilibrium Quantum Statistics of Trapped Ideal Bose Gases; (2009)
• Tobias Grass: Real-Time Ginzburg-Landau Theory for Bosonic Gases in Optical Lattices; (2009)
• Pascal Mattern: Quench Dynamics of Bosons in Optical Lattices; (2009)
• Lance Labun (USA): Dipolar Bose Gases; DAAD-RISE-Program
• Henrik Enoksen (Norway): Green's Function of Bosons in Optical Lattices; DAAD-IAESTE-Program (2007)
• Kiel Howe (USA): Rotating Spinor-Fermi Gases; DAAD-RISE-Program (2008)
• Barry Bradlyn (USA): Effective Action of Bosons in Optical Lattices; DAADRISE-Program (2008)
• Isaac Abban-Mensah (Ghana): Hanbury Brown-Twiss-Effect of Bosons in Optical Lattices; DAAD-IAESTE-Program (2008)
• Melek K¨ uc ¨ uktalaslio (Turkey): Green's Function of Bose-Fermi Mixture in Optical Lattices; DAAD-IAESTE-Program (2008)
• Avinash Kumar (India): Fidelity of a Quantum Mechanical Particle in Random Potential; SFB/TR 12 (2008)
• Srinivas Kumar (India): Vortices in Bose-Einstein Condensates (2009)
• Bridget Bertoni (USA): Dipolar Spinor Fermi Gases; DAAD-RISE-Program (2009)
• Jerome Simons (USA): Frustation of Bosons in Triangular Optical Lattice; DAAD-RISE-Program (2009)
• Artem Gryshchuk (Ukraine): Bose-Gas in Random Potential; DAAD-IAESTE

• Eduardo Paulo Jorge da Costa Alves (Portugal): Two Weakly Coupled Bose-Gases; DAAD-IAESTE-Program (2009)

Other Teaching Duties

Courses on Quantum Field Theory and Many-Body Physics

Novello Mario

Position: Professor

Period covered: 2003-present

Scientific Work

1. Theoretical Cosmology with emphasis in Bouncing cosmological models

2. Nonlinear field theory in flat and curved spacetime - effective geometry

3. Spinor theory of gravity

4. Books on popularization of science:

    a) O que e Cosmologia (2008) Editor; Jorge Zahar (in portuguese)

    b) Sobre o universo de Godel (2007) Editor; Jorge Zahar (in portuguese)

    c) Do Big-bang ao Universo Eterno (to appear in 2010) Editor; Jorge Zahar (in portuguese)

5. Scientific articles

Recent articles (2008-2009):

    a) Bouncing Cosmology (with SEP Bergliaffa) Physics Report (2008)

    b) Cyclic Magnetic Universe. (M. Novello, Aline N. Araujo and J M Salim) in International Journal of Modern Physics A (2009).

    c) Gravitational waves on singular and bouncing FRW universes (with V. Antunes and E, Goulart) in Gravitation and Cosmology (2009) v 15, 191.

    d) Gaussian coordinate system for Kerr metric (with E,H,S, Bittencourt) 2009

    e) Spin-2 field theory in terms of Cartan geometry (with P.I.Trajtenberg) to appear as a chapter in a book (2009)

    f) Cosmology; a book to be published in 2010 by Brazilian Institute of Physics (in portuguese)

    g) Non linear Electrodynamics (causal properties and cosmological effects) – with E. Goulart: a book to be published in 2010 by Brazilian Institute of Physics (in portuguese)

    h) Constructing Dirac linear fermions in terms of non-linear Heisenberg spinors. Europhysics Letters EPL, 80 (2007) 41001 e-Print: arXiv:0705.2692 [astro-ph]

i) A Spinor theory of gravity and the cosmological framework.
JCAP 706:018,2007.

j) The Nature of Lambda and the mass of the graviton: A Critical view (with J P Gazeau). Journal of Physics A 41 (2008) 304008 (e-Print: gr-qc/0610054)

k) Cosmological Effects of Nonlinear Electrodynamics. Published in Class.Quant.Grav.24:3021-3036,2007.

l) Nonlinear electrodynamics and the Pioneer 10/11 spacecraft anomaly. Published in Europhys.Lett.77:19001,2007.

m) A toy model of a fake inflation. (with E Huguet and J, Queva) Published in Phys.Rev.D73:123531,2006.

Conferences and educational activities

Conferences and Other External Scientific Work

July (2009) Escola Brasileira de Cosmologia (Rio de Janeiro)
May (2009) Sobral Meeting (Fortaleza – Ceará)
July (2009)XII Marcel Grossman Meeting (Paris)

Diploma thesis supervision

Erico Goulart
Maria Borba
Aline N. Araújo
Josephine Rua
Vicente Antunes
R P Neves

Work With Postdocs

Santiago E.P. Bergliaffa

Herman Mosquera Cuesta

Leo Medeiros

Works

Cosmology: Theory and Observations - Bouncing cosmological models

Nonlinear field theory in flat and curved spacetime - effective geometry

Spinor Theory of Gravity

O*ther*

Received the title of Docteur Honoris Causa from University of Lyon (France)

Speech by Professor E. Elbaz for the acknowledgement of the title of "Docteur Honoris Causa" of the University Claude Bernard to Mario Novello (March 2004)

After this presentation I read the first chapter of my book "O que é Cosmologia?" Ed. Jorge Zahar, Rio de Janeiro, 2006

2009 List of Publications

Articles in 2008-2009

NOVELLO, M. ; BERGLIAFFA, S. E. P. . Bouncing Cosmologies. Physics Reports, v. 463, p. 127-213, 2008.

NOVELLO, M. ; Novello, M . The question of mass in (anti-) de Sitter spacetimes. Journal of Physics. A, Mathematical and Theoretical, v. 41, p. 304008, 2008.

GAZEAU, J. ; NOVELLO, M. . The Nature of Lambda and the mass of the graviton. Journal of Physics. A, Mathematical and General, 2008.

NOVELLO, M. ; BERGLIAFFA, S. E. P. . Bouncing Cosmology. Physics Reports, 2008.

NOVELLO, M.. Participação em banca de Cristina Furnaleto. Implicações cosmológicas de um campo escalarcom ação de Born-Infeld estendida. 2008. Dissertação (Mestrado em Física) - Centro Brasileiro de Pesquisas Físicas.

Aline Nogueira de Araujo. Propriedades dos Universos Ciclicos. Início: 2008. Tese (Doutorado em Física) - Centro Brasileiro de Pesquisas Físicas, Coordenação de Aperfeiçoamento de Pessoal de Nível Superior. (Orientador).

Vicente Antunes. Universos com bouncing (ricochete). Início: 2008. Tese (Doutorado em Doutorado em Física-CBPF) - Centro Brasileiro de Pesquisas Físicas. (Orientador).

ALINE NOGUEIRA DE ARAUJO. UNIVERSO MAGNÉTICO CICLICO. 2008. Dissertação (Mestrado em Física) - Centro Brasileiro de Pesquisas Físicas, . Orientador: Mario Novello.

ERICO GOULART DE OLIVEIRA COSTA. EXCITAÇÕES DO TENSOR DE WEYL NA COSMOLOGIA E QUESTÕES DE ESTABILIDADE. 2008. Tese (Doutorado em Física) - Centro Brasileiro de Pesquisas Físicas, . Orientador: Mario Novello.

Popov Vladimir

Position: Leading scientist

Institute of Theoretical and Experimental Physics

Period covered: 1970 - present

I Scientific Work

In recent years Popov's research focus on: the theory of multiphoton ionization of atoms and ions, including the relativistic generalization of Keldysh ionization theory for the case of multicharged ions; the process of electron-positron pair production from vacuum by the field of intense optical and X-ray lasers; development of the "imaginary time" method in theory of tunneling of relativistic particles; application of the Feynman method of disentangling of noncommuting operators to non-stationary problems of quantum mechanics; theory of massive nuclear density cores with account for gravitational interaction.

II Conferences and educational activities

International Conference "The Sun, the Stars, the Universe and General Relativity", Minsk, April 2009.

III Service activities

Journal of Experimental and Theoretical Physics, member of editorial board (1993 -)

2009 List of Publications

S.V.Popruzhenko, V.D.Mur, V.S.Popov, D.Bauer. Strong field ionization rate for arbitrary laser frequencies. Phys. Rev. Lett. **101** (2008), 193003-1-4; ZhETF **135** (2009), 1092.

V.S.Popov, M.A.Trusov. Generating functions and sum rules for quantum oscillator. Phys. Lett. **A373** (2009), 1925.

V.S.Popov. From supercharged nuclei to massive nuclear density cores. Proc. Intern. Conf. "The Sun, the Stars, the Universe and General Relativity. Zeldovich Meeting" (Minsk, April 2009).

V.S.Popov. My recollections of Ya.B.Zeldovich, Proc. Intern. Conf. "Zeldovich Meeting"

Punsly Brian

Position: Research Scientist

Period covered: 2009

I Scientific Work

Brian Punsly/ICRANet Research 2009 and 2010

ABSTRACT:

This report describes the research performed by Brian Punsly in cooperation with ICRANet in 2009 and 2010.

1. Introduction

In 2009 and 2010, the research was concentrated in three areas, long term 3-D MHD numerical simulations of black hole magnetospheres, in depth high resolution VLBA monitoring of the nearby quasar MRK 231, and X-ray observations of quasars with polar broad UV absorption line outflows. I summarize these three lines of research in the next three sections.

2. Three Dimensional Simulations of Vertical Magnetic Flux in the Immediate Vicinity of Black Holes

This article was written with Igor V. Igumenshchev (Laboratory for Laser Energetics, University of Rochester) and Shigenobu Hirose (The Earth Simulator Center, JAMSTEC) (Punsly et al 2009).

This paper highlights the theoretical work developed in Punsly (2008) in intricate 3-D detail.

Abstract: This article reports on three-dimensional (3-D) MHD simulations of non-rotating and rapidly rotating black holes and the adjacent black hole accretion disk magnetospheres. A particular emphasis is placed on the vertical magnetic flux that is advected inward from large radii and threads the equatorial plane near the event horizon. In both cases of non-rotating and rotating black holes, the existence of a significant vertical magnetic field in this region is like a switch that creates powerful jets. There are many similarities in the vertical flux dynamics in these two cases in spite of the tremendous enhancement of azimuthal twisting of the field lines and enhancement of the jet power because of an “ergospheric disk" in the Kerr metric. A 3-D approach is essential because two-dimensional axisymmetric flows are incapable of revealing the nature of vertical flux near a black hole. Poloidal field lines from the ergospheric accretion region have been visualized in 3-D and much of the article is devoted to a formal classification of the different manifestations of vertical flux in the Kerr case.

3. 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 effort was done in collaboration with Cormac Reynolds (Curtin University of Technology, Department of Imaging and Applied Physics), Preeti Kharb and Christopher P. O'Dea (Department of Physics, Rochester Institute of Technology) and Joan Wrobel (NRAO, Socorro).

Abstract: We report on the first high frequency VLBI observations of the nearby broad absorption line quasar (BALQSO), Mrk 231. Three epochs of observations were achieved at 15 GHz and 22 GHz, two of these included 43 GHz observations as well. The nuclear radio source is resolved as a compact double. The core component experienced a strong °are in which the flux density at 22 GHz increased by > 150% (45 mJy) in three months. Theoretical models of the flare imply that the emission is likely enhanced by very strong Doppler boosting of a highly relativistic ejecta with a kinetic energy flux, $Q \sim 3 \times 10^{43}$ ergs/sec. Combining our data with two previous epochs of 15 GHz data, shows marginal evidence for the slow advance of the secondary component (located ≈ 0.97 pc from the core) over a 9.4 year span. We estimate that the long term time averaged kinetic energy flux of the secondary at $Q \approx 10^{42}$ ergs/sec. Low frequency VLBA observations indicate that the secondary is seen through a shroud of free-free absorbing gas with an emission measure of $\approx 10^{8} cm^{-6}$ pc. The steep spectrum secondary component appears to be a compact radio lobe that is associated with a working surface between the ram-pressure confined jet, and a dense medium that is likely to be the source of the free-free absorption. The properties of the dense gas are consistent with the temperatures, displacement from the nucleus and the column density of total hydrogen commonly associated with the BAL wind.

3.1. Large VLBA Proposal Approved

We have already received approval for a more aggressive look at this object.

3.1.1. 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).

3.1.2. 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.

3.1.3. Coordinating with X-ray Observations

I am working with Jesper Rasmussen of the Carnegie Observatories in Pasadena in proposal work to coordinate X-ray observations with the target of opportunity VLBA observations of Mrk 231. We are collaborating with Chris O'Dea, Cormac Reynolds and Joan Wrobel on a recently submitted XMM proposal. The proposal is aimed at seeing inverse Compton emission flares that are correlated with the microwave flares. We also hope to see how the absorption column varies as the flare propagates away from the central engine

4. X-ray observations of Polar Broad Absorption Line Quasars

Developing more on the models of Punsly (1999a,b) I have been working with Kajal Ghosh (Universities Space Research Association, NASA Marshall Space Flight Center) to study other polar broad absorption line quasars (BALQSOs) particularly in the X-ray. This year, we have already observed 3 polar BALQSOs with Chandra and 1 with Suzaku (90 ks observation). The objects were proven to be polar in our paper Ghosh and Punsly (2007). We have also been granted observing time to look at 6 more with Chandra and three long exposures with XMM.

REFERENCES

Ghosh, K. and Punsly, B. 2007 ApJL 661 139

Punsly, B., Igumenshchev, I. and Hirose, S. to appear in October 20 issue of ApJ 2009

http://arxiv.org/abs/0908.3697

Punsly, B. 1999, ApJ 527 609

Punsly, B. 1999, ApJ 527 624

Punsly, B. 2008, Black Hole Gravitohydromagnetics, second edition (Springer-Verlag, New

York)

Reynolds, C. et al to appear in ApJ

Quevedo Hernando

Position: Visiting Professor

Period covered: November 17, 2008 – November 16, 2009

I Scientific Work

- Investigation of exact solutions of Einstein's equations with multipole moments and their application for the description of the gravitational field of astrophysical objects.

- Analysis of repulsive gravity to determine the minimum size of astrophysical compact objects.

- Analysis of repulsive gravity to study the structure of accretion disks around naked singularities.

- Application of geometrothermodynamics in the context of black hole thermodynamics.

- Application of topological quantization in the case of mechanical systems with a finite number of degrees of freedom

II Conferences and educational activities

Conferences and Other External Scientific Work

- Sobral Meeting, (Fortaleza, Brazil), May 26 – 28, 2009

- Sixth Italian-Sino Workshop, (Pescara, Italy), June 29 – July 1, 2009

- Second Italian-Pakistani Workshop, (Pescara, Italy), July 8 – 10, 2009

- Marcel Grosmann Meeting, (Paris, France), July 12 – 18, 2009

- First Galileo – Xu Guangqi Meeting, (Shanghai, China), October 26 – 30, 2009

- Eleventh Italian-Korean Meeting, (Seoul, Korea), November 2 – 4, 2009

Visits to other universities:

- University of Cologne (Germany), July 20 – 25, 2009
- University of Barcelone (Spain), July 26 – 31, 2009

Work With Students (ICRANet students)

- Kuantay Boshkayev
  Topic: Exact and approximate metrics in astrophysics

- Orlando Luongo
  Topics: Geodesic motion in a mass-quadrupole field
  Cosmological models in modified theories of gravity

- Daniela Pugliese
  Topic: Study of circular motion around naked singularities

- Safia Taj
  Topic: Geometrothermodynamics of black holes

Diploma thesis supervision (UNAM students):

- Jose Alvarez (PhD)
  Topic: Statistical models for black holes

- Francisco Hernandez (PhD)
  Topic: Holography in field theories

- Francisco Nettel (PhD)
  Topic: Topological quantization in string theory

- Leticia Plascencia (MSc)
  Topic: Statistical models in geometrothermodynamics

- Moices Rodriguez (PhD)
  Topic: Topological quantum mechanics

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

Work With Postdocs

- Andrea Geralico (ICRANet)
  Topic: Geodesic motion in a mass-quadrupole field

- Alberto Sanchez (UNAM)
  Topic: Geometrothermodynamics and statistics of black holes

2009 List of Publications

Geometric description of BTZ black holes thermodynamics.
Hernando Quevedo, Alberto Sanchez
Published in Phys.Rev.D79:024012,2009.
Geometrothermodynamics of black holes in two dimensions.
Hernando Quevedo, Alberto Sanchez
Published in Phys.Rev.D79:087504,2009.

Generalized Kerr spacetime with an arbitrary mass quadrupole moment: geometric properties vs particle motion.
Donato Bini, Andrea Geralico, Orlando Luongo, Hernando Quevedo,
Published in Class.Quant.Grav.26:225006,2009.

Gravitational fields as generalized string models.
Francisco J. Hernandez, Francisco Nettel, Hernando Quevedo
Published in Grav.Cosmol.15:109-120,2009.

Topological spectrum of mechanical systems
Francisco Nettel, Hernando Quevedo, Moices Rodriguez
To be published in Rep.on Math.Phys., 2009

Topological quantization of the harmonic oscillator
Francisco Nettel, Hernando Quevedo
To be published in Int.J.Pure Appl. Math., 2009

Papers submitted or in preparation

Exact and approximate solutions of Einstein's equations for astrophysical compact objects
K. Boshkayev, H. Quevedo and R. Ruffini

On the minimum size of astrophysical compact objects
R. Kerr, H. Quevedo and R. Ruffini

Circular motion of test particles in Reissner-Nordstrom spacetime
D. Pugliese, H. Quevedo and R. Ruffini

Cosmological tests of the Horava-Lifshitz gravity model
O. Luongo and H. Quevedo

Geometrothermodynamics of higher dimensional black holes in Einstein-Gauss-Bonnet theory
H. Quevedo and S. Taj

Thermodynamic systems as extremal hypersurfaces
A. Vazquez, H. Quevedo, A. Sanchez

Invariant geometry of the ideal gas
A. Vazquez, H. Quevedo, A. Sanchez

Statistical thermodynamics of economic systems
H. Quevedo and M.N. Quevedo

Rosquist Kjell

Period covered: 2008-2009

I Scientific Activities

Ongoing projects

1. Spatial curvature in cosmology
   Spatial curvature is a key factor in cosmological theory. We are investigating properties of spatial curvature, such as estimating its size directly from the mass distribution in the universe and we are also analyzing theoretically how the spatial curvature depends on the observer.
   Collaborators: L. Samuelsson, Umeå University, Sweden and H. Quevedo, ICRANet

2. Inhomogeneous cosmology
   The matter in the present universe occurs in discrete lumps such as stars and galaxies. However, current models of the universe treat the matter as a homogeneous fluid. The purpose of this project is to attempt to quantify how the discrete nature of the matter influences the evolution of the universe. One ingredient in this quest is to determine the size of the spatial curvature as outlined in the previous project.
   Collaborator: L. Samuelsson, Umeå University, Sweden

3. Microphysical gravitomagnetic effects
   In Einstein gravity, the source of the gravitational field has an additional part, namely the spin (or angular momentum) which is responsible for the gravitomagnetic field in analogy with the magnetic field in electromagnetism. In this project we work with the Einstein-Maxwell field equations which are responsible for the interaction between the gravitational and electromagnetic fields. We use solutions of the field equations to examine how the gravitomagnetic field induces modifications of the Coulomb electromagnetic field at the Compton scale. The results are amenable to experimental verification.
   Collaborators: L. Samuelsson, Umeå University, Sweden, M. von Strauss, Stockholm University, Sweden
   Consultant: R. Ruffini, ICRANet

4. Black holes as accelerators
   When particles collide near black holes, they can in principle attain extremely high center-of-mass energies. We are estimating the practical limits on the energy of particles escaping from such collisions near black holes.
   Collaborator: M. von Strauss, University of Stockholm, Sweden

5. Dynamics on a curved background.

    a. Influence of the expansion of the universe on local systems
    A local system such as the solar system, e.g., is in principle influenced by the cosmological spacetime curvature. In this project we are investigating the long term effects on local systems caused by the expansion of the universe.
    Collaborator: G. Pucacco, ICRANet and University of Rome

    b. Influence on local systems when crossing stationary horizons
    In a non-stationary spacetime, local energy conservation is broken due to the non-existence of a local time translation symmetry. We are investigating the loss of energy conservation for a system falling into a black hole which is necessarily non-stationary inside the horizon.
    Collaborator: G. Pucacco, ICRANet and University of Rome
    Consultant: V. Belinski, ICRANet

6. Separability of relativistic systems
    The Hamiltonian of a relativistic mechanical system includes a timelike part in the kinetic energy in addition to the momenta present in standard classical mechanics. Consequently, the Hamiltonian has an indefinite signature as opposed to the positive definite signature of systems in standard classical mechanics. Relativistic systems have two new types of separability structures in addition to the Hamilton-Jacobi type separability for non-relativistic systems. To obtain a better of understanding of relativistic systems, we are investigating and classifying the new separability types.
    Collaborator: G. Pucacco, ICRANet and University of Rome

II Conferences and educational activities

Conferences and Other External Scientific Work

Lectures and talks at the University of Rome and at conferences:

Bego Scientific Recontres, Nice, February 2006

Eleventh Marcel Grossmann Meeting on General Relativity (MG11), Berlin, July 2006

Italy-Korea meeting, Pescara, June 2007

18th International Conference on General Relativity and Gravitation **(**GR18), Sydney, July 2007

12th Marcel Grossmann conference on general relativity, Paris 2009 (2 talks)

First Galileo-Xu Guang-qi meeting 2009

11th Italian-Korean meeting 2009

Invited talks 2009

Albert Einstein Institute, Potsdam, Germany

ICRA/CBPF, Rio de Janeiro, Brazil

Erasmus Mundus Ph D program

Work with upcoming Erasmus Mundus Joint Doctorate Ph D program starting 2010 with several European and extra-European universities including Stockholm University.

Work With Students

Mikael von Strauss, graduate student
– Project on interacting fields using the theory of general relativity

Diploma thesis supervision

Tomas Bylund
– Carter's constant

Other Teaching Duties

Courses taught in the academic year 2008-2009:

Relativistic quantum mechanics (advanced undergraduate level)

Waves and Quantum Mechanics (undergraduate level)

Work With Postdocs

Lars Samuelsson at the Nordita Institute, Stockholm.
– Work on Carter's constant and other aspects of relativistic astrophysics

III Service activities

Within ICRANet

Adviser at various scientific committees

Member of Ph D committee for G. Yegorian thesis, Rome University, 2008

Outside ICRANet

External examiner of licentiate thesis 2006 of Thomas Bäckdahl, Linköping University, Sweden.

Member of Ph D committee 2008 for Thomas Bäckdahl, Linköping University, Sweden

V Other

Collaboration with R. Ruffini, V. Belinski and others on aspects of general relativity, in particular field energy and interactions including both gravity and electromagnetic fields.

2009 List of Publications

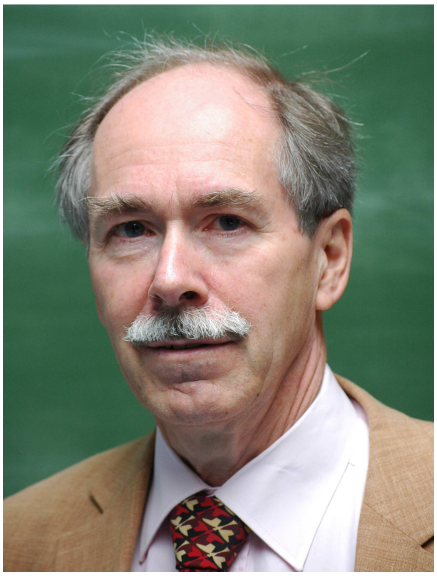
K. Rosquist, T. Bylund and L. Samuelsson, Carter's constant revealed, Int. J. Mod. Phys. D 18 (2009) 429, (E-print, arXiv:0710.4260).

K. Rosquist, A unifying coordinate family for the Kerr-Newman metric, Gen. Rel. Grav. 41 (2009) 2619.

K. Rosquist, Some Consequences of Gravitationally Induced Electromagnetic Effects in Microphysics, J. Kor. Phys. Soc. (2009) (in press).

G. Pucacco and K. Rosquist, Non-standard separability on the Minkowski plane, J. Nonlinear Math. Phys. 2009 (in press)

‘tHooft Gerard



Position: Professor in Theoretical Physics at Utrecht University

I Scientific Work

Gauge theories in elementary particle physics
Quantum gravity and black holes
Fundamental aspects of quantum physics

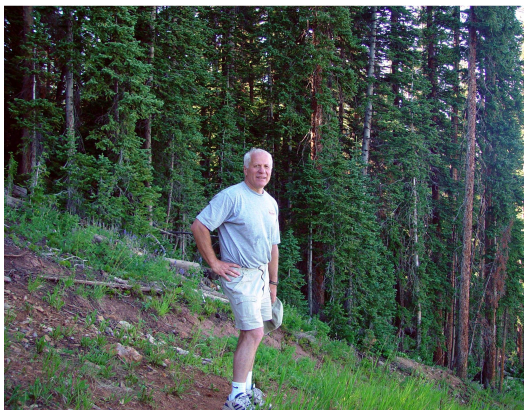
2009 List of Publications

The fundamental nature of space and time, in Approaches to Quantum Gravity, Toward a New Understanding of Space, Time and Matter, D. Oriti Ed., Cambridge Univ. Press 2009, ISBN 978-0-521-86045-1 (pbk), pp. 13-25.

Entangled quantum states in a local deterministic theory, 2nd Vienna Symposium on the Foundations of Modern Physics (June 2009), ITP-UU-09/77, SPIN-09/30; arXiv:0908.3408

Quantum Gravity without Space-time Singularities or Horizons, Erice School of Subnuclear Physics 2009, to be publ.; arXiv:0909.3426

Titarchuk Lev



Position: Professor of University of Ferrara and

senior scientist of Goddard Space Flight Center

Period covered: 1st Nov 2008 - 1st Nov 2009.

I Scientific Work

1. Titarchuk, L., Shaposhnikov, N 2008, ApJ, 678, 1230

2. Farinelli, R., Titarchuk, L. , Paizis, A., Frontera, F. 2008, ApJ, 680, 602

3. Montanari, E., Titarchuk, L., Frontera, F. 2009, ApJ, 652, 1597

4. Farinelli, R., Paizis, A., Landi, R. & Titarchuk, L. 2009, A&A, 498, 509

5. Shaposhnikov, N., Titarchuk, L. 2009, ApJ, 699, 453

6 Shaposhnikov, N., Titarchuk, L, Laurent, P. 2009, ApJ, 699, 1223

7. Gliozzi, M, Satyapal, S., Eracleous, M., Titarchuk, L. Cheung, C. C. ApJ, 700, 1759

8. Titarchuk, L., Laurent, P., Shaposhnikov, N. 2009, ApJ, 700, 1831

9. Titarchuk, L., Seifina, E. 2009, ApJ, December 10th.

II Conferences and educational activities

Conferences and Other External Scientific Work

1. Zeldovich meeting in Minsk, April 2009
2. ICRANET seminar in the end of August, 2009
3. Marcel Grossman meeting in July 2009, Paris
4. Agile meeting in Rome in the end of September
5. Ferrara meeting on Compact objects from 11-12 of September

Work With Students

Working with ICRANET PhD student Chiara Ceccobello on her thesis.

Work With Postdocs

Drs. Ruben Farinelli, Enrico Montanari

List of Publications

1 2007 L.Titarchuk, S. Kuznetsov & N. Shaposhnikov `` Correlations between X-ray spectral and timing characteristics in Cygnus X-2'' ApJ, 667, 404

2 2008 L. Titarchuk & N. Shaposhnikov "On the Nature of the Variability Power Decay Towards Soft Spectral States in X-Ray Binaries: Case Study in Cyg X-1" (72717). ApJ, 678, 1230

3 2008 R. Farinelli, L. Titarchuk, A. Paizis, F. Frontera `` A new Comptonization model for low-magnetized accreting neutron stars in low mass X-ray binaries'' ApJ, 680, 602

4 2008 E. Montanari, L.Titarchuk & F. Frontiera ``BeppoSAX Observations of the Power and Energy Spectral Evolution in the Black Hole Candidate XTE J1650-500'' ApJ, accepted

Lecturers

Aksenov Alexey

Position: Senior scientific staff member

Laboratory for Astrophysics and Plasma Physics

Inst. for Theoretical and Experimental Ph. Moscow

Period covered: 2000-present

Scientific Work

Stellar rotation, collapse of stars cores, neutrino transport, neutrino luminosity curves, gravitational radiation, Z-pinches, heavy ion fusion, 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 from the surface of a compact star, etc.

II Conferences and educational activities

2009: Interaction of Intense Energy Fluxes, Elblus, Russia; Zeldovich Meeting, Minsk, Belorussia; Marsell Grossmann General Relativity, Paris, France; Russian-Japan seminar Turbulence and instabilities, Moscow, Russia

2008: Stueckelberg Workshop on Relativistic Field Theories, Pescara, Italy; Seminar on parallel computations, Pushino, Russia

III Service activities

Within ICRANet

2008-2009 Visitor at Icranet 1-3 months per year

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

2009 List of Publications

Heavy ion targets for the inertial thermonuclear fussion and for experiments with high energy density in matter. Aksenov A.G., Fortova S.V., Troshkin O.V. Collection Phys. of Ectreme States of Matter ed. by Fortov V.E. et al, Institute of Problems of Chem. Phys. RAS, Chernogolovka.

Thermalization of the mildly relativistic plasma. Aksenov A.G., Ru¢ ni R., Vereshchagin G.V. Phys. Rev. D, 79, d3008.

The canonical Gamma-Ray Bursts: long, .fake.-.disguised. and .genuine. short bursts. Ru¢ ni R. et al, AIP Conf. Proc., 1111, 325.

Thermalization of pair plasma with proton loading. Aksenov A.G., Ru¢ ni R., Vereshchagin G.V., AIP Conf. Proc., 1111, 344.

The Blackholic energy and the canonical Gamma-Ray Burst IV: the .long,..genuine short. and .fake-disguised short.GRBs. Ru¢ ni R. et al, AIP Conf. Proc., 1132, 199.

Bini Donato

Position: Reasercher at

Istituto per le Applicazioni del Calcolo, CNR

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

I'm a co-tutor of Dr. V. Montaquila, a Ph.D. student at the 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

I'm continuosly working with 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. B. Mashhoon (University of Missouri-Columbia 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. A. Tartaglia (Politecnico of Turin, Italy)
Prof. P. Fortini (university of Ferrara)
Dr. A. Ortolan (INFN Legnaro, Padova)

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'm 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'm leader of young researchers projects of INDAM (Istituto Nazionale di Alta Matematica). Title of the project: *Sistemi di Posizionamento Globale relativistici*

2009 List of publications

Bini D., .Cherubini, C., Geralico, A., Ortolan, A.
Dixon's extended bodies and weak gravitational waves
General Relativity and Gravitation, vol. 41, 105, 2009.

Bini D., Capozziello S., Esposito G.
Gravitational waves about curved backgrounds: a consistency analysis in De Sitter spacetime,
International Journal of Geometric Methods in Modern Physics,
Vol. 5, No. 7 1069–1083, 2008.

Bini D., Esposito G., Montaquila R.V.,
The vector wave equation in de Sitter space-time
General Relativity and Gravitation, 2009, in corso di stampa.

Bini D., Cherubini C., Filippi S.
On vortices heating biological excitable media,
Chaos, Solitons and Fractals vol. 42, 2057–2066, 2009.

Bini D., Cherubini C., Geralico A., Jantzen R. T.
Electrocardiogram of the Mixmaster Universe,
Classical and Quantum Gravity, vol. 26, 025012, 2009.

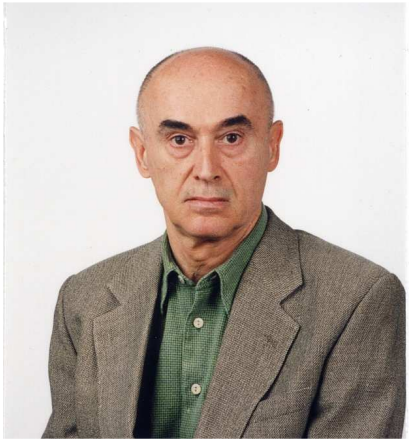
Bini D., Jantzen R. T., Stella L.
The general relativistic Poynting-Robertson effect
Classical and Quantum Gravity, vol. 26, 055009, 2009.

Bini D., Cherubini C., Filippi S., Geralico A.
Extended bodies with quadrupole moment interacting with gravitational monopoles: reciprocity relations
General Relativity and Gravitation, 2009, in corso di stampa.

Bini D., Geralico A., Luongo O., Quevedo H.
Kerr spacetime with an arbitrary mass quadrupole moment: geometric properties vs particle motion,
Classical and Quantum Gravity, vol. 26, 225006 (23pp), 2009.

Bini D., Geralico A., Jantzen R.T.
"Exact" Fermi coordinates in the Schwarzschild spacetime,
Classical and Quantum Gravity, submitted, 2009.

Boccaletti Dino



Position: Professor of Celestial Mechanics

University of Rome “La Sapienza”

Period covered: 1987- 2008

I Scientific Work

Researches in the field of Physics of Elementary particles (in the first period), Theoretical Astrophysics, Theory of the gravitational waves, Stellar Dynamics, Celestial Mechanics, Mathematical Physics. The relevant papers are published on Nature, Nuovo Cimento B, Physical Review D, Astronomy & Astrophysics, Celestial Mechanics & Dynamical Astronomy. An aside activity has regarded the history of Astronomy.

II Conferences and educational activities

In the last years communications at meetings on General Relativity and Celestial Mechanics

Work With Students

In the last twenty years many students have been aided at the beginning of their researches on topics of Celestial Mechanics and someone supervised until the doctorate

Diploma thesis supervision

Since 1987 about 70 thesis on topics of Celestial Mechanics

Other Teaching Duties

Member of the “Collegio Docenti” of the “Dottorato in Astronomia” at the University of Rome “La Sapienza” until October 31th 2007. Member of the Faculty of the IRAP PhD until October 31th 2008.

Work With Postdocs

Researches in collaboration.

The latest postdoc is still involved in researches in collaboration (application of the technique of the normal forms to the study of galactic potentials).

III Service activities

Within ICRANet

No direct service activities but collaboration in some occasion regarding topics of research of mutual interest

IV Other

Member of IAU (International Astronomical Union)
• Commission 7 (Celestial Mechanics & Dinamical Astronomy)
• Commission 41 (History of Astronomy)
Member of SAIT (Società Astronomica Italiana)

2009 List of Publications

A theorem of Beltrami and the integration of the geodesic equations, Dino Boccaletti, Francesco Catoni, Roberto Cannata, Paolo Zampetti, *11th Marcel Grossmann Meeting on General Relativity June 23-29 Berlin. Proceedings.*

Chakrabarti Sandip K.

Position: Senior Professor

S. N. Bose National Centre for Basic Sciences, Kolkata

and

In Charge, Academic Affairs, Indian Centre for Space Physics

Recent period in which ICRA was visited: July 19-29th, 2006; Oct. 28-30th, 2007; Aug. 29th-Sept. 1St, 2008

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 155 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

Last twelve years he has produced 15 Ph.D. scholars and another 6 students are registered and would submit their thesis soon. Four more students have joined since last year. The students mainly worked on (a) jets and outflows; (b) nucleosynthesis around black holes, (c) Planetary ring dynamics; (d) Quasi-periodic Oscillations of GRS 1915+105; (e) Transonic accretion flows with heating and cooling; (f) gravitational waves emitted from a binary which has an accretion disk also; (g) Multiwavelength studies of SS433; (h) Spectral properties of accretion disks having shock waves; (i) Formation of simple bio-molecules during star formation; (j) Grain chemistry using Monte-Carlo simulations etc.

Seven of his students have already received permanent positions in national institutions.

Other Teaching Duties: Generally he takes courses on high energy astrophysics at S.N. Bose Centre and R.K.M. College (autonomous MSc in Astrophysics).

Work With Postdocs: he has several colleagues including post-docs.

III Service activities

Within ICRANet :

(a) Participated in the activities of Minsk Conference (April, 2009)

(b) Participated in the Marcel Grossman Conference (July, 2009)

(c) Participated in the Galileo-Xu-Guanqi conference (October, 2009)

(d) Contributed in writing Erusmus Mundus joint PhD programme (May, 2009) which was successful.

2009 List of Publications

Talks/papers

(a) Presented a paper on Astrobiology at the Minsk conference in absentia and wrote the paper for the proceedings of the conference (AIP)

(b) Chaired the Session on Astrophysical Black Holes in Marcel Grossman meeting at the UNESCO HQ (July, 2009). This trip was supported by ICRA NET also.

(c) Attended the 1st Galileo -Xu Guanqi meeting in Shanghai (October, 2009) and presented a talk on Unifying model on Accretion on black holes.

Papers in Journals:

1. S. K. CHAKRABARTI, D. DEBNATH, A. NANDI and P.S. PAL, 2008, Evolution of Quasi-Periodic Oscillation Frequency in GRO J1655-40 -- Implications on Accretion Disk Dynamics, Astronomy and Astrophysics , 489L, 41

2. K. CHAKRABARTI, M.M. MAJUMDAR and S.K. CHAKRABARTI, 2008, Accretion onto compact objects viewed as a flow in converging-diverging ducts, IJMPD, 17(5), 799

3. P. BASU, S. MONDAL, S.K. CHAKRABARTI, 2008, Gravitational wave emissionfrom a massive companion black hole in presence of an accretion disk around a super-massive Kerr black hole, MNRAS, 388, 219

4. A. DAS, K. ACHARYYA, S. CHAKRABARTI, S.K. CHAKRABARTI, 2008, Formation of Water and Methanol in Star forming Molecular clouds, Astronomy & Astrophysics, 486, 209

5. S. Das & S.K. CHAKRABARTI, Dissipative accretion flows around a rotating black hole, 2008, MNRAS, 389, 371

6. D. DEBNATH, S. K. CHAKRABARTI, A. NANDI & S. MANDAL, Spectral and Timing evolution of GRO J1655-40 during its outburst of 2005, 2008, BASI 36, 151

7. S. MANDAL & S. K. CHAKRABARTI, 2008, Spectrum of an accretion disk around a supper-massive black hole: an application to M87, Astrophysical Journal, 689, 17

8. S.K. CHAKRABARTI, B.G. DUTTA & P.S. PAL, 2009, Accretion flow behaviour during the evolution of the Quasi Periodic Oscillation Frequency of XTE J1550-564 in 1998 outburst, 2009, MNRAS, 394, 1463

9. S. MONDAL, P. BASU AND S. K. CHAKRABARTI, 2009 Studies of accretion flows around rotating black holes - III. Shock oscillations and an estimation of the spin parameter from QPO frequencies, MNRAS, 396, 1038

10. S. Sasmal & S.K. Chakrabarti, 2009, Ionosperic Anomaly due to Seismic Activities -I: Calibration of the VLF signal of VTX 18.2KHz Station From Kolkata and Deviation During Seismic events, Nat. Hazards Earth Syst. Sci., 9, 1403-1408.

Edited Volume:

1. S. K. Chakrabarti and A. S. Majumdar (Eds): OBSERVATIONAL EVIDENCE FOR BLACK HOLES IN THE UNIVERSE: Proceedings of the 2nd Kolkata Conference on Observational Evidence for Black Holes in the Universe held in Kolkata India, 10 - 15 February 2008 and the Satellite Meeting on Black Holes, Neutron Stars, and Gamma-Ray Bursts held 16 - 17 February 2008 (AIP).

Papers in Proceedings:

1. Das, A., Acharyya, K. Chakrabarti, S., Chakrabarti, S. K., Methanol formation: A Monte Carlo study by 2008, in Organic Matter in Space, Proceedings of the International Astronomical Union, IAU Symposium, Volume 251, p. 121 (CUP).

2. Chakrabarti, S. K.; Bhoumik, D.; Debnath, D.; Sarkar, R.; Nandi, A.; Yadav, V.; Rao, A. R., CSPOB-Continuous Spectrophotometry of Black Holes, 2008, in AIP Conf. Proc. 1053, p. 409 (AIP).

3. Bhoumik, D., Mondal, S., Chakrabarti, S. K., Developments of Si-PIN detectors for Continuous Spectro-photometry of Black Holes (CSPOB), 2008, in AIP Conf. Proc., 1053, 403 (AIP).

4. Palit, S., Chakrabarti, S. K.; Debnath, D., Yadav, V., Nandi, A. Fresnel zone plates for Achromatic Imaging Survey of X-ray sources, 2008, in AIP Conf. Proc., 1053, 391 (AIP).

5. Ghosh, H., Chakrabarti, S. K.; Laurent, P., Inverse Comptonization in a Two Component Advective Flow: Results of a Monte Carlo simulation, 2008, in AIP Conf. Proc., 1053, 373 (AIP).

6. Das, S., Chakrabarti, S. K., Standing accretion shock waves around rotating black holes in presence of cooling, 2008, in AIP Conf. Proc., 1053, 373 (AIP).

7. Chakrabarti, S. K., Black Hole Accretion: From Quasars to Nano-Quasars, 2008, in AIP Conf. Proc., 1053, 325 (AIP).

8. Sarkar, R.; Chakrabarti, S. K.; Nandi, A., X-ray Observation of SWIFT J1753.5-0127 with RXTE & XMM-Newton, 2008, in AIP Conf. Proc., 1053, 215 (AIP).

9. Pal, Partha S., Nandi, A., Chakrabarti, S. K., Dynamical Nano Quasar GRS 1915+105, 2008, in AIP Conf. Proc., 1053, 209 (AIP).

10. Debnath, D.; Nandi, A.; Pal, P. S.; Chakrabarti, S. K., QPO Evolution in 2005 Outburst of the Galactic Nano Quasar GRO J1655-40, 2008, in AIP Conf. Proc., 1053, 171 (AIP).

11. Dutta, Broja G.; Chakrabarti, Sandip K.; Pal, Partha S., Evolution of QPOs in XTE J1550-564 in 1998 outburst: a Case of Quasi Outburst?, 2008, in AIP Conf. Proc., 1053, 171 (AIP).

12. Choudhury, A. K.; Chatterjee, A. K.; Bari, W.; Chakrabarti, S. K., Live Coverage of Class Transitions in the Nano Quasar GRS 1915+105, 2008, in AIP Conf. Proc., 1053, 161 (AIP).

13. Basu, Prasad; Chakrabarti, Sandip K., Gravitational wave emission from a companion black hole in presence of an accretion disk around a super-massive Kerr black hole, 2008, in AIP Conf. Proc., 1053, 161 (AIP).

14. Chakrabarti, S.K., Mondal, S.K., Sasmal, S. and Bhowmick, D., Detailed lightcurves of ICSP VLF observation of SGR/AXP 1E1547.0-5408, 2009, GCN, 8900

15. Chakrabarti, S.K., Mondal, S.K., Sasmal, S. and Bhowmick, D., ICSP VLF observation of the signatures of SGR/AXP 1E1547.0-5408 bursts, 2009, GCN, 8881.

Filippi Simonetta

Position: Associate Professor (Fis/02) in Theoretical Physics.

Integrated Center for Research

Biomedical Engineering faculty,

Period covered: 1st November 2003-today

I Scientific Work

-Physics of self-gravitating systems

-Nonlinear dynamics and complex systems

-Relativistic Astrophysics and Cosmology

II Conferences and educational activities

Conferences and Other External Scientific Work

- 12th Marcel Grossman Meeting, Paris 2009.

Other Teaching Duties

1) Engineering Faculty (University Campus Biomedico)

Reader: Dynamics of Complex Systems

Reader: Mechanics and Thermodynamics

2) Medicine Faculty(University Campus Biomedico):

Coordinator of the courses of Physics for Medicine,Nursing and Dietology.

3) Reader of IRAP PhD

4) Reader and examiner at University La Sapienza of Rome for

the course of Theoretical Physics II.

Work With Postdocs

Prof. Filippi is involved in research activities with Dr Andrea Geralico on problems of General Relativity and effective curved geometries in non-relativistic fluids,

III Service activities

Within ICRANet

Organization of conference activities in the ICRA center of Pescara as well as in the organization of other ICRA meetings.

Other

Prof. Filippi has a longstanding collaboration with other ICRANET scientists. In particular in collaboration with Prof. Remo Ruffini and Prof. Alonso Sepulveda, she he has written plenty articles in various areas of self-gravitating systems and Galactic Structures. She also collaborates with Dr Donato Bini and Dr Christian Cherubini in the fields of Complex Systems in Nature, effective geometries in non relativistic fluids, Astrophysics and General Relativity.

2009 List of Publications

1) D. BINI, C CHERUBINI. and S. FILIPPI. ”On vortices heating biological excitable media”.Chaos, Solit. and Fract., 42; 2057 (2009)

2) C. CHERUBINI and S. FILIPPI “Lagrangian field theory of reaction-diffusion”. Phys Rev E, 80; 046117 (2009).

Lee Hyung Won

Position: Professor

Period covered: 2008.1 – 2009.10

I Scientific Work

1. Yong-Wan Kim, Hyung Won Lee and Yun Soo Myung, “Entropy bound of local quantum field theory with generalized uncertainty principle”, Phys. Lett. **B673**, 293(2009)

2. Kyoung Yee Kim, Hyung Won Lee and Yun Soo Myung, “Density perturbations in decaying holographic dark energy models”, Mod. Phys. Lett. **A24**, 1267(2009).

II Conferences and educational activities

Conferences and Other External Scientific Work

Second Italian-Pakistan Sysmposium, 8-10 July 2009, Pescara Italy

12th Marcel-Grossmann Meeting, 12-18 July 2009, Paris France

11th Italian-Korean Symposium, 2-4 November 2009, Seoul Korea

Other Teaching Duties

General Physics for premedical and electrical engineering students

Mester John C.

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

EDUCATION

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

PROFESIONAL AFFILIATIONS

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

EXPERIENCE

Hansen Experimental Physics Laboratory, Stanford University 1992 – present

Lecturer: 2009 – present
Stanford Aero/Astro Department

- Lead graduate course on Space Systems Engineering and Design

Director: 2006 – present
Precision Spacecraft Control for Space Science Missions.

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

Program Manager and Co-Investigator: 1999 – present
The Satellite Test of the Equivalence Principle (STEP) Program – a NASA and European sponsored technology development collaboration.

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

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

EXPERIENCE continued

Hansen Experimental Physics Laboratory, Stanford University

Senior Research Scientist: 1992 – 2005

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

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

Goettel & Associates, Inc. Davis, CA 95616 1997 – present

Consultant:

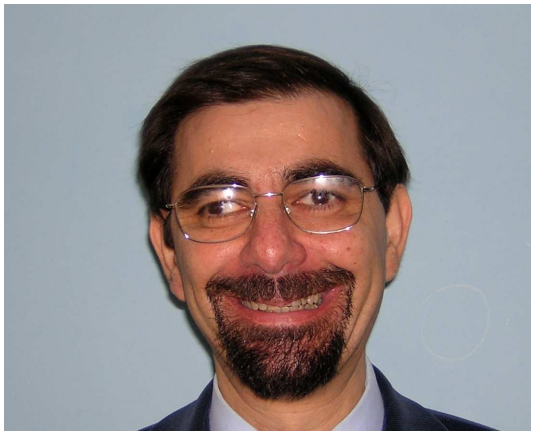
- Conduct benefit-cost analyses and review hazard mitigation programs for FEMA, State agencies, and private sector clients
- Develop mathematical models for flood and earthquake hazard scenarios

Institut Henri Poincaré, UMPC Université de Paris VI, Paris, France 2006

Visiting Professor:

- Developed and taught graduate course on experimental tests of General Relativity
- Invited Speaker, Poincaré Seminar public lecture series

Montani Giovanni



Position: ENEA Researcher displaced at ICRANet

Period covered: 2005/09

I Scientific Work

Fundamental General Relativity, Quantum Gravity, Extra-dimensional physics, Early Cosmology, Plasma Physics

II Conferences and educational activities (2009)

XII Marcel Grossmann Meeting, Paris 12 - 18 July 2009
II Italo Pakistan Meeting, Pescara 2009
IV Sino-Italia, Pescara 2009

Work With Students

Coordination of a research group within ICRANet on Cosmology, Gravity and Multidimension.

The group is constituted by post-docs, PhD and undergraduates students, and it produces around 10/15 publications per year.

Diploma thesis supervision

3 undergraduate students during 2009 only.

Other Teaching Duties

Lecturer for the “Primordial Cosmology” class.

2009 List of Publications

N. Carlevaro, O.M. Lecian and G. Montani, “Fermion dynamics by internal and space-time symmetries”, Mod. Phys. Lett. A, 24, 415 (2009).

F. Cianfrani and G. Montani, “Towards Loop Quantum Gravity without the time gauge”, Phys. Rev. Lett., 102, 091301 (2009).

F. Cianfrani, G. Montani and S. Zonetti, Definition of a time variable with Entropy of a perfect fluid in Canonical Quantum Gravity, Class. Quant. Grav, 26 125002 (2009)

F. Cianfrani. V. Lacquaniti and G. Montani, “Particles and fields within a unification scheme”, J. Korean Phys. Soc., in press.

O.M. Lecian, G. Montani, “Riemannian and non-Riemannian extensions of geometro-dynamics versus Einsteinian gravity’’, J. Korean Phys. Soc., in press.

N. Carlevaro and G. Montani, “Jeans instability in presence of viscous effects”, Int. J. Mod. Phys. D, in press.

V. Lacquaniti and G.Montani, “Dynamics of Matter in a compactified 5D Kaluza-Klein Model”, Int. J. Mod. Phys. D, in press.

F. Cianfrani and G. Montani, “The role of time-gauge in quantizing gravity”, in Proc. of 3rd Stueckelberg Workshop, in press.

F. Cianfrani and G. Montani, “Review on Extended approaches in the Kaluza-Klein model”, in Proc. of 3rd Stueckelberg Workshop, in press.

G. Montani, N. Carlevaro, F. Cianfrani and V. Lacquaniti, “Perspective in cosmology, gravitation and multidimensions”, in Proc. of 3rd Stueckelberg Workshop, in press.

F. Cianfrani, G. Montani and S. Zonetti, “Definition of a time variable with entropy of a perfect fluid in Canonical Quantum Gravity”, in Proc. of 3rd Stueckelberg Workshop, in press.

N. Carlevaro and G. Montani, “A Novel Approach to Lorentz Gauge Theory”, in Proc. of 3rd Stueckelberg Workshop, in press.

N. Carlevaro and G. Montani, “The Jeans Mechanism and bulk-viscosity effects”, in Proc. of 3rd Stueckelberg Workshop, in press.

M.V. Battisti and G. Montani, “Bianchi IX the GUP approach”, in Proc. of 3rd Stueckelberg Workshop, in press.

M.V. Battisti, R. Belvedere and G. Montani, “Semi-classical isotropization of the Mixmaster Universe”, in Proc. of 3rd Stueckelberg Workshop, in press.

M.V. Battisti, O.M. Lecian and G. Montani, “GUP vs Polymer quantum Cosmology: the Taub Universe”, in Proc. of 3rd Stueckelberg Workshop, in press.

V. Lacquaniti, G. Montani and F. Vietri, “Geodesic deviation on a Kaluza-Klein background”, in Proc. of 3rd Stueckelberg Workshop, in press.

V. Lacquaniti, G. Montani “Recent developments on matter dynamics within the Kaluza-Klein picture”, in Proc. of 3rd Stueckelberg Workshop, in press.

R. Benini and G. Montani, “Review on the generic cosmological solution near the singularity” , in Proc. of 3rd Stueckelberg Workshop, in press

M.V. Battisti, R. Belvedere and G. Montani, “Semiclassical suppression of the weak anisotropies of a generic Universe”, Europhysics Letters, 86, 69001 (2009)

V. Lacquaniti and G. Montani, “Geometry and Matter Reduction in a 5D Kaluza-Klein Framework”, Mod. Phys Lett. A, in press

V. Lacquaniti, G. Montani and F. Vietri, “Dimensional Reduction of the 5D Kaluza-Klein Geodesic Deviation Equation”, Gen. Rel. Grav., (2009)
DOI 10.1007/s10714-009-0853-3.

M.V. Battisti and G. Montani, “The Mixmaster Universe in a generalized uncertainty principle framework”, Phys. Lett. B., 681, 179-184 (2009)

F. Cianfrani, G. Montani, “Matter in Loop Quantum Gravity without time gauge: a non-minimally coupled scalar field”, Phys. Rev. D, 80, 084045 (2009).

F. Cianfrani, G. Montani, “Immirzi parameter from an external scalar field”, Phys. Rev. D, 80, 084040 (2009).

F. Cianfrani, O.M. Lecian and G. Montani, “Fundamentals and recent developments in non-perturbative canonical Quantum Gravity”, submitted to Gen. Rel. Grav.

O.M. Lecian and G. Montani, “Spinor interactions and non-Riemannian geometry”, submitted to J. Math. Phys.

G. Montani e R. Benini, “Linear Two-dimensional MHD of Accretion disks: Crystalline structure and radial matter infall”, submitted to MPLA

Perez Bergliaffa Santiago Esteban

Position: Professor – Department of Theoretical Physics, Institute of Physics, University of the State of Rio de Janeiro (Brazil).

Period covered at ICRANet: 20 days (July-August 2009).

I Scientific Work

I work in Gravitation, Cosmology, and Classical Field theory, in three main lines: f(R)-theories (Cosmology and Black Holes), bouncing universes, and effective metric in nonlinear field theories. During my visit to ICRANET I worked on the manuscript A Classification of the effective metric in nonlinear electrodynamics, with my collaborator Erico Goulart de Oliveira Costa, which was published Class.Quant.Grav.26:135015,2009 (0905.3673 [gr-qc]). I also published in period covered by this report the article Bouncing Cosmologies, along with M. Novello, Phys. Rept. 463: 127-213,2008 (0802.1634 [astro-ph]).
See my CV at http://lattes.cnpq.br/2925938973363409.

II Conferences and educational activities

Conferences and Other External Scientific Work

I delivered the course “Black Holes” at the University of the State of Ceará (Fortaleza, Brazil), in March 2008. This course is part of the itinerant Program of Cosmology, Relativity, and Astrophysics, organized by Icra/Brasil.

I participated in the organization of the XIII Brazilian School of Cosmology e Gravitation, held at Mangaratiba (State of Rio de Janeiro, Brazil) from July 20 to August 3, 2008, and I was co-editor of the Proceedings, published by AIP.

I gave the seminar The effective metric and the energy-momentum tensor at the Institute of Physics of the Federal University of Rio de Janeiro, on November 13, 2008.

I was part of the Organizing Committee of the meeting The Sun, the Stars, the Universe, and General Relativity, held in Fortaleza (State of Ceará, Brazil), from May 26 to May 29, 2009, and I am co-editing the Proceedings of this meeting, which will be published by AIP.

I gave the seminar Analog Black Holes at the Institute of Astronomy and Geophysics of the Federal University of São Paulo, on May 19, 2009.

I participated in the last edition of the Marcel Grossmann Meeting (Paris, 2009), where I presented the communication Static and Spherically Symmetric Black Holes in f(R) Theories. A new version

of this work, which will be soon submitted for publication, with my student Yves Ciffarelli as co-author, was presented at the International Workshop of Astronomy and Relativistic Astrophysics (IWARA 2009), held in Maresias (State of São Paulo, Brazil).

Diploma thesis supervision

I am currently co-advising 2 PhD students (Claudia Isabel Azucena P. Rivasplata, of the Brazilian Center for Research in Physics (Rio de Janeiro, Brazil) , and Florencia Anabella Teppa Pannia, of the National Observatory of La Plata, Argentina).

Other Teaching Duties

I am teaching several courses at the graduate level in the University of the State of Rio de Janeiro.

Other

I participated in the elaboration and negotiation of the Agreement between ICRANet and the University of the State of Rio de Janeiro, signed by the Head of the University, Prof. Ricardo Vieiralves, and Prof. Remo Ruffini. The details of the implementation of the Agreement will be specified in an Addendum, that is currently under way.

2009 List of Publications

A Classification of the effective metric in nonlinear electrodynamics. Erico Goulart de Oliveira Costa, (Rio de Janeiro, CBPF) , Santiago Esteban Perez Bergliaffa, (Rio de Janeiro State U.) . May 2009. 17pp. Published in Class.Quant.Grav.26:135015,2009.
e-Print: arXiv:0905.3673 [gr-qc]

I was co-editor of the proceedings of the BSCG: COSMOLOGY AND GRAVITATION: XIII Brazilian School on Cosmology and Gravitation (XIII BSCG) Mario Novello, Centro Brasileiro de Pesquisas Fisicas, Rio de Janeiro, Brazil ; Santiago Perez, Universidade do Estado do Rio de Janeiro, Departamento de Fisica Teórica, Rio de Janeiro, Brazil AIP Conference Proceedings 1132 Conference Location and Date: Rio de Janeiro, Brazil, 20 July - 2 August 2008 Published May 2009

Vissani Francesco

Position: Senior INFN researcher.

Head of Gran Sasso Theory group since 2006.

ICRANet lecturer since October 2009

Period covered: 2009

I Scientific Work

Models of neutrino signal from gravitational collapse. Connection with gravity wave search.
Very high energy neutrinos from supernova remnants.

II Conferences and educational activities

Conferences and Other External Scientific Work

April: Incontri di Fisica delle Alte Energie, Bari; talk on: Sugli obiettivi della astronomia neutrinica. VESF Council Meeting, Osservatorio di Monte Porzio Catone; talk on: Neutrinos from supernovae as trigger for GW search.

June: ICTP Summer School on particle physics in the era of LHC. Course on: ``Neutrinos'

September: Commissione Scientifica Nazionale II, INFN, Rome, rounda table on on perspects of neutrino astronomy; talk on : A candidate for observations: RX J1713.7-3946

October: The sun, the stars, the universe and general relativity, first Galileo-Xu Guangqi meeting), Shanghai, China; talk on Potential of neutrino detectors as monitors of gravitational core collapses

Work With Students

Advisor of Giulia Pagliaroli. PhD thesis on supernova neutrinos, defended with success on April 2009 at L'Aquila University. Since December, Giulia will join the theory group of Gran Sasso with a postdoc contract.

Begun to follow the student Andrea Alami (Rome 3) for a diploma thesis on electroweak reactions.

Six months visit of Fernando Rossi Torres, PhD student at
Campinas University, Brasil, to collaborate on supernova neutrinos.

III Service activities

Proceedings of
MEASUREMENT OF NEUTRINO MASS

Ed. C. Brofferio, F. Ferroni, F. Vissani
CLXX Varenna International School of Physics,
Jun 2008. Published on 2009 by SIF Bologna and IOS Amsterdam.

V Other

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

2009 List of Publications

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: Senior Lecturer, Department of Physics & Astronomy, University of Canterbury, Christchurch, New Zealand

Period covered: 29 July 2008 – 30 October 2008

I Scientific Work

Prof. Wiltshire completed work for two research papers during his three month visit to ICRANet. Both papers relate to his current program of investigating the possibility that effects attributed to dark energy and cosmic acceleration have their origin in a misidentification of gravitational energy gradients within the inhomogeneous structure of the universe, once structures form. This "radically conservative" solution to the problem of dark energy has begun to attract a reasonable amount of interest, and has already featured prominently in the popular press, with a cover feature in *New Scientist* in March, 2008.

2009 publications from work at ICRANet

D.L. Wiltshire, "Average observational quantities in the timescape cosmology", Phys. Rev. D 80 (2009) in press; arXiv:0909.0749

D.L. Wiltshire, "From time to timescape: Einstein's unfinished revolution", Int. J. Mod. Phys. D (2009) special issue, in press; an essay for the FQXi 2008 Essay Competition on the Nature of Time, http://www.fqxi.org/data/essay-contest-files/Wiltshire_time.pdf

D.L. Wiltshire, "Gravitational energy as dark energy: Towards concordance cosmology without Lambda", in *Dark Energy and Dark Matter: Observations, Experiments and Theories*, eds E. Pécontal, T. Buchert, Ph. Di Stefano and Y. Copin, EAS Publications Series 36 (2009) 91-98

D.L. Wiltshire, "Dark energy without dark energy: Average observational quantities", to be published in Dark Matter in Astroparticle and Particle Physics: Proceedings of the 7th International Heidelberg Conference, eds H.V. Klapdor-Kleingrothaus (World Scientific, Singapore)

D.L. Wiltshire, "Gravitational energy as dark energy: Average observational quantities", to be published in Proceedings of the Invisible Universe Conference, Paris 2009, ed J.M. Alimi (AIP Conference Series)

Research Scientists

Benini Riccardo

Position: Post Doc at Physics Dept

University of Rome “Sapienza”

Period covered: 01/10/09 - 30/09/10

I Scientific Work

Dynamics of the Universe near the Big-Bang, Homogeneous Models, Quantum Gravity, Canonical Formalism in General Relativity and Statistical Mechanics, Role of Plasma Physics in the Early Universe and Accretion Disks.

II Conferences and educational activities

• XII Marcel Grossmann Meeting, July 12-18, 2009, Paris (France)

• III Stueckelberg Workshop on Relativistic Field Theories, July 8-18, 2008 - Pescara (Italy)

• II Stueckelberg Workshop on Relativistic Field Theories, September 3-7, 2007 - Pescara (Italy)

• 7 BritGrav, April 3-4, 2007 Cambridge (UK).

• XI Marcel Grossmann Meeting, July 23-29, 2006, Berlin (Germany).

• I Stueckelberg Workshop on Relativistic Field Theories, June 25 -July 1 2006 Pescara (Italy)

• III Italian-Sino Workshop on Cosmology and Relativistic Astrophysics, July 10-20 2005 Pescara (Italy)

Bernardini Maria Grazia

Position Postdoctoral Research Fellow (Assegnista di Ricerca)

Period covered 2005 - 2009

I Scientific Work

- Analysis of GRB970228 as an example for GRBs characterized by an initial spikelike emission followed by a soft bump like e.g. GRB050724, GRB060614, identifying in this way a possible new class of GRBs whose peculiarities depend on their astrophysical setting.
- Study of the association between Gamma-Ray Bursts and Type Ib/c Supernovae, with particular interest toward the induced gravitational collapse phenomenon as a possible explanation for this association.
- Study of the X-ray flares in the context of the Fireshell model, assuming that they are produced in the interaction with an inhomogeneous CircumBurst Medium. Development of a 2-dimensional numerical code to account for the CBM distribution.
- Statistical analysis of the properties of X-ray flares observed by *Swift.*
- Study of the GRB light curve and spectrum in the AGILE and *Fermi*-GLAST era.

II Conferences and educational activities

Talks presented to international conferences:

- "A complete analysis of GRB060607A within the fireshell model: prompt emission, X-ray flares and late afterglow phase" and "Collisions in the slowing down phase of the prompt emission" at the *"XII Marcel Grossman Meeting on General Relativity"*, Paris (France), July 12-18, 2009.
- "Collisions in the slowing down phase of the prompt emission" at the *"2nd Italian-Pakistani Workshop on Relativistic Astrophysics"*, Pescara (Italy), July 8-10, 2009.
- "GRB060607A: prompt emission and X-ray flares" at the*"6th Italian-Sino Workshop in Relativistic Astrophysics"*, Pescara (Italy), June 29 – July 1, 2009.
- "Preliminary analysis of GRB060607A and GRB060418 within the fireshell model" at the *"Probing Stellar Populations out to the Distant Universe"*, Cefalù (Italy), September 14-19, 2008.

- "The GRB classification within the fireshell model: short, long and fake short GRBs " at the *"3rd Stueckelberg Workshop on Relativistic Field Theories"*, Pescara (Italy), July 8-18, 2008.
- "Preliminary analysis of GRB060607A within the fireshell model" at the *"2008 Nanjing GRB Conference"*, Nanjing (China), June 23-27, 2008.
- "Testing the "Canonical GRB" Scenario" at the "2nd Kolkata Conference on the Observational Evidence for Black Holes in the Universe", Kolkata (India), February 10-17, 2008.
- "GRB970228 and a class of GRBs with an initial spikelike emission" at the *"4th Italian-Sino Workshop on Relativistic Astrophysics"*, Pescara (Italy), July 20-30, 2007.
- "A new interpretation of GRB970228" at the *"10th Italian-Korean Symposium on Relativistic Astrophysics"*, Pescara (Italy), June 25-30, 2007.
- "GRB970228: a prototype for a new GRB class" at the *"APS April Meeting"*, Jacksonville (USA), April 14-17, 2007.
- "GRB970228 as a prototype for Short GRBs with afterglow" at the *"Cesare Lattes Meeting on GRBs Black Holes and Supernovae"*, Mangaratiba (Brazil), February 25-March 3, 2007.
- "GRB970228 as a prototype for Short GRBs with afterglow" at the *"XII Brazilian School of Gravitation and Cosmology"*, Mangaratiba (Brazil), September 10-23, 2006.
- "GRB970228 as a prototype for Short GRBs with afterglow" and "Theoretical interpretation of luminosity and spectral properties of GRB980425" at the *"XI Marcel Grossmann Meeting on General Relativity"*, Berlin (Germany), July 23-29, 2006.
- "Theoretical model on Gamma-Ray Burst" at the *"IX Italian-Korean Symposium on Relativistic Astrophysics"*, Seoul (South Korea) – Mt. Kumgang (North Korea), July 19-24, 2005.

External Scientific Work:

- Postdoctoral research fellowship at "Osservatorio Astronomico di Brera" within the *Swift* Italian Team.

Work With Students:

- Students of the IRAP-PhD program at University "La Sapienza", Rome, Italy: Letizia Caito, Maria Giovanna Dainotti, Gustavo De Barros, Roberto Guida, Luca Izzo, Barbara Patricelli, Luis Juracy Rangel Lemos.

PhD thesis supervision:

- 2009: Thesis advisor of the IRAP-PhD Degree Thesis by Barbara Patricelli at University "La Sapienza", Rome, Italy.

Other Teaching Duties

- Collaboration with the *Swift* Italian Team

III Service activities

Within ICRANet

- Member of the Local Organizing Committee for the "4th Italian-Sino Workshop on Relativistic Astrophysics" held in Pescara (Italy) on July 20-30, 2007.

Outside ICRANet

- Member of the Scientific Organizing Committee and Local Organizing Committee for the ICRA Weekly Seminars organized by the Physics Department of the University of Rome "La Sapienza"

2009 - List of Publications

Publications in refereed journals

Letizia Caito, Maria Grazia Bernardini, Carlo Luciano Bianco, Maria Giovanna Dainotti, Roberto Guida, Remo Ruffini, *"GRB060614: a "fake" short GRB from binary merging"*, **A&A 498 (2009) 501-507.**

Conference proceedings

Maria Grazia Bernardini, Carlo Luciano Bianco, Letizia Caito, Maria Giovanna Dainotti, Roberto Guida, Remo Ruffini, *"Prompt emission and X-ray flares: the case of GRB 060607 A"*, in the Proceedings of *"Probing the Stellar Population out of the Distant Universe: Cefalù 2008"*, in Cefalù, Italy, September 7-19, 2008, ed. G. Giobbi, A. Tornambe, G. Raimondo, M. Limongi, L. A. Antonelli, N. Menci, E. Brocato, AIP Conf. Proc., 1111 (2009) 383.

Carlo Luciano Bianco, Maria Grazia Bernardini, Letizia Caito, Maria Giovanna Dainotti, Roberto Guida, Remo Ruffini, *"The "fireshell" model and the "canonical GRB" scenario. Implications for the Amati relation"*, in the Proceedings of *"Probing the Stellar Population out of the Distant Universe: Cefalù 2008"*, in Cefalù, Italy, September 7-19, 2008, ed. G. Giobbi, A. Tornambe, G. Raimondo, M. Limongi, L. A. Antonelli, N. Menci, E. Brocato, AIP Conf. Proc., 1111 (2009) 587.

Remo Ruffini, Aleksei Aksenov, Maria Grazia Bernardini, Carlo Luciano Bianco, Letizia Caito, Maria Giovanna Dainotti, Gustavo de Barros, Roberto Guida, Gregory Vereshchagin, She-Sheng Xue, *"The Canonical Gamm-Ray Bursts: Long, "Fake"-"disguised" short and "genuine" short GRBs"*, in the Proceedings of *"Probing the Stellar Population out of the Distant Universe: Cefalù 2008"*, in Cefalù, Italy, September 7-19, 2008, ed. G. Giobbi, A. Tornambe, G. Raimondo, M. Limongi, L. A. Antonelli, N. Menci, E. Brocato, AIP Conf. Proc., 1111 (2009) 325.

Cherubini Christian

Position: University Researcher (Fis/02) in Theoretical Physics.

Integrated Center for Research

Biomedical Engineering faculty,

University “Campus Bio-Medico”

Period covered: 1st November 2007-today

I Scientific Work

- Astrophysics of self-gravitating fluids.
- General relativistic perturbation theory.
- Cosmology.
- Numerical Relativity.
- Acoustic black holes.
- Theoretical biophysics focused on pathological physiology of cardiac and neural tissues and on cancer growth modelling.

II Conferences and educational activities

Conferences and Other External Scientific Work

1999 -Second ICRA Network Workshop "Chaotic Universe" Rome-Pescara (ITALY).

-Third ICRA Network Workshop “Electrodynamics and Magnetohydrodynamics around Black Holes” Rome-Pescara (ITALY).

2000 -9th Marcel Grossmann a Roma (ITALIA).

2001 -Royal Astronomical Society meeting on Cosmological Models, London, (GREAT BRITAIN).

2002 -Wheeler Symposium, Princeton NJ (USA).

2003 -10th Marcel Grossmann in Rio de Janeiro (BRASIL).

-8th Italian-Korean Symposium on Relativistic Astrophysics in Pescara (ITALY).

-Inaugural Meeting of the Center for Gravitational Wave Astronomy,

Brownsville, TX (USA)

2004 -Elba Meeting in Honour of Y. Choquet-Bruhat "Analysis, Manifolds And Geometric Structures in Physics", Isola d'Elba (ITALY).

2005 - Russian-Italian Lifshitz-Zeldovich Meeting on Relativistic Astrophysics, Pescara (ITALY)

-9th Italian-Korean Symposium on Relativistic Astrophysics, Seoul (SOUTH KOREA) and Mt.Kumgang (NORTH KOREA).

-COMSOL Italian Multiphysics Meeting, Milan (ITALY).

2006 -Bego scientific Rencontres, Nice (FRANCE).

-Eleventh Marcel Grossmann Meeting on General Relativity, Berlin (GERMANY).

-COMSOL Users Conference, Milan (ITALY).

2007 -Cardiac MEF and Arrhythmias Conference, Oxford (GREAT BRITAIN).

-10th Italian-Korean Symposium on Relativistic Astrophysics in Pescara (ITALY).

-4th Italian-Sino Workshop on Relativistic Astrophysics in Pescara (ITALY).

-APS Meeting in Jacksonville (USA)

2008 - Experimental Chaos Conference in Catania (Italy)

2009 - 2nd Italian-Pakistani Workshop Relativistic Astrophysics in Pescara (ITALY)

Other Teaching Duties

2003/04 Assistant "General Physics I"
(Engineering Faculty, University Campus Bio-Medico)

2004/05 Assistant "General Physics I" and "Dynamics of Complex Physiological Systems"
(Engineering Faculty, University Campus Bio-Medico)

2005/06 Assistant "General Physics I" and "Dynamics of Complex Physiological Systems"
(Engineering Faculty, University Campus Bio-Medico)

2006/07 Assistant "General Physics I" and "Dynamics of Complex Physiological Systems"
(Engineering Faculty, University Campus Bio-Medico)

2007/08 Lecturer “Physics” (Alimentation and Human Nutrition Sciences, Medicine Faculty, University Campus Bio-Medico) and Assistant “General Physics I” and “Dynamics of Complex Physiological Systems” (Engineering Faculty, University Campus Bio-Medico)

2008/09 Lecturer “Physics” (Alimentation and Human Nutrition Sciences, Medicine Faculty, University Campus Bio-Medico) and Assistant “Mechanics and Thermodynamics” and “Dynamics of Complex Physiological Systems” (Engineering Faculty, University Campus Bio-Medico)

2009/10 Lecturer “Physics” (Alimentation and Human Nutrition Sciences, Medicine Faculty, University Campus Bio-Medico) and Assistant “Mechanics and Thermodynamics” and “Dynamics of Complex Systems” (Engineering Faculty, University Campus Bio-Medico)

Work With Postdocs

The main collaboration of Dr Cherubini with ICRANET postdocs has been with Dr Andrea Geralico, in relation with perturbation theory in General Relativity and quasi-local energy definitions in charged and rotating black hole spacetimes (Dyadotorii). Moreover in this context a collaboration with a doctoral student, Mr Jorge Rueda, has been established.

III Service activities

Within ICRANet

Organization of conference activities in the ICRA center of Pescara (3rd ICRA Network workshop and Sixth Italo-Korean Meeting 1999) as well as in the organization of the 9th Marcel Grossmann in Rome (2000).

Other

Dr Cherubini has a longstanding collaboration with other ICRANETscientists. In particular in collaboration with Dr Donato Bini, Prof. Robert T Jantzen and Prof. Remo Ruffini he has written plenty articles in various areas of General Relativity. In collaboration with Dr Giovanni Montani he has studied some problems of cosmology while 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.

2009 List of Publications

Cherubini C., Geralico A, Rueda J.A.H and R. Ruffini R “e--e+ pair creation by vacuum polarization around electromagnetic black holes”. Phys Rev D ,79; p. 124002-1 (2009).

Cherubini C. and Filippi S “Lagrangian field theory of reaction-diffusion”. Phys Rev E, 80; 046117 (2009).

Bini D, Cherubini C., Geralico A, Ortolan A “Dixon’s extended bodies and weak gravitational waves”. Gen. Rel. and Grav, 41; 105 (2009).

Bini D, Cherubini C., Geralico A and Jantzen R.T “Electrocardiogram of the Mixmaster universe”. Class. Quantum Grav, 26; 025012 (2009)

Bini D, Cherubini C. and Filippi S. ”On vortices heating biological excitable media”.Chaos, Solit. and Fract., 42; 2057 (2009)

Cianfrani Francesco

Position: Research Fellowship

Period covered: 2009

I Scientific Work

Hamiltonian analysis of the Holst formulation in a generic local Lorentz frame;

Extended phase space approaches in Quantum Gravity;

Geometrization of gauge interactions in a multi-dimensional space-time.

II Conferences and educational activities

Conferences and Other External Scientific Work:

XIIth Marcel Grossmann Meeting, Paris, July 12-18.

Other Teaching Duties:

lectures for the undergraduate course ``Fisica Generale'' by Prof. S. Rahatlou at the department of biology, University of Rome ``Sapienza''.

2009 List of Publications

F. Cianfrani, G. Montani, ``Matter in Loop Quantum Gravity without time gauge: a non-minimally coupled scalar field'', *Physical Review D*, in press, arXiv:0904.4435.

F. Cianfrani, G. Montani, ``The Immirzi parameter from an external scalar field'', *Physical Review D*, **80**, (2009) 084040, arXiv:0907.1530.

F. Cianfrani, G. Montani, S. Zonetti ``Definition of a time variable with Entropy of a perfect fluid in Canonical Quantum Gravity'', *Classical and Quantum Gravity*, **26**, 125002, (2009), arXiv:0807.3281.

F. Cianfrani, G. Montani, ``Towards Loop Quantum Gravity without the time gauge'', *Physical Review Letters*, **102**, (2009) 091301, arXiv:0811.1916.

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 2001-2009

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)

2009 List of publications

Bini D., Cherubini C., **Geralico A.**, Jantzen R. T.,
Electrocardiogram of the Mixmaster universe,
Classical and Quantum Gravity, vol. 26, 025012, 2009

Cherubini C., **Geralico A.**, Rueda J. A. H., Ruffini R.,
e^--e^+ pair creation by vacuum polarization around electromagnetic black holes,

Physical Review D, vol. 79, 124002, 2009.

Bini D., **Geralico A.**, Luongo O., Quevedo H.,
Generalized Kerr spacetime with an arbitrary mass quadrupole moment: geometric properties vs particle motion,
Classical and Quantum Gravity, vol. 26, 225006, 2009.

Lattanzi Massimiliano

Position: ICRA Postdoctoral fellow at the Physics Department, "Sapienza" University of Rome

Period covered: 2002 - Present

I Scientific Work

His main research interest are in the areas of Cosmology and Astroparticle Physics. He has been studying the role of neutrinos in cosmological evolution, and the possibility of measuring neutrino-related quantities through cosmological observation.

During his Ph. D. studies, carried at the "Sapienza" University in Rome under the supervision of R. Ruffini from 2002 to 2005, he has obtained a robust upper limit on the cosmological lepton asymmetry from analysis of the cosmic microwave background data (see ML, Ruffini, Vereshchagin, PRD 72, 063003, 2005). In the same period, together with G. Montani, he has studied the issue of the interaction of cosmological gravitational waves with neutrinos (ML & Montani, Mod. Phys. Lett. A 20, 2607, 2005). This latter work has been recently extended to include the interaction with spinning particles (Milillo, ML, Montani, IJMP A23, 1278, 2008).

In 2006, he spent one year as a post-doc at the Institute for Particle Physics in Valencia (Spain), where he mainly collaborated with J. Valle and S. Pastor, other than with other post-docs and Ph.D. students. Here he studied, together with J.W.F. Valle, the possibility of relating the problem of dark matter to the issue of the origin of neutrino masses, proposing a new dark matter candidate, the majoron (ML, Valle, PRL 99, 121301, 2007) and studying the perspectives for its indirect detection (Bazzocchi, ML, Riemer-Sørensen, Valle, JCAP 0808:013, 2008). The collaboration with this spanish institution continues to date, and has recently led to a paper where tight limits are found on the cosmological significance of the so-called "mass-varying neutrinos" scenarios (França, ML, Lesgurgues, Pastor, PRD 80, 083506, 2009).

In 2007-2008, he has been working with J. Silk at the Oxford University (UK) on the topic of indirect detection dark matter, focusing mainly on the signal produced by the annihilation of supersymmetric particles. Cumberbatch, ML and Silk (submitted to PRD) have studied the 21cm signal generated by neutralino and light dark matter annihilations. In 2008, ML and Silk (PRD 29, 083523, 2009) have proposed a scenario to explain the anomalous positron excess observed by the PAMELA experiment in terms of supersymmetric dark matter annihilations. In particular, this scenario involves the enhancement of the dark matter annihilation cross-section in cold substructures inside the galaxy, by means of a quantum effect known as the "Sommerfeld effect". The paper has been very well received by the dark matter community and has stimulated a wide discussion on the topic.

Since the beginning of 2009, he is working as an ICRA post-doctoral fellow at the "Sapienza" University in Rome. In the past few months, he has been carrying on the already existing lines of

research, producing a follow-up to the paper on the Sommerfeld enhancement (Pieri, ML, Silk, MNRAS, in press) and the above-mentioned paper on mass-varying neutrinos. He also started new projects and new collaborations that will likely lead to scientific publications in the near future. Among them, there is the study of the relevance of neutrino decoupling for the detection of cosmological gravitational waves (with R. Benini and G. Montani), a statistical analysis of cosmological models with a vanishing cosmological constant (with A. Melchiorri, S. Pandolfi), a study of the relevance of plasma physics to cosmology (with R. Benini, N. Carlevaro , B. Coppi, G. Montani, R. Ruffini), and the study of the possibility of using Gamma-ray bursts as standard candles (with L. Izzo and R. Ruffini)

II Conferences and educational activities

Conferences and Other External Scientific Work

2009

- TAUP 2009, Rome, Italy
- 2nd Italian-Pakistani Workshop on Relativistic Astrophysics, Pescara, Italy
- 12th Marcel Grossmann Meetin on General Relativity, Paris, France

2008

- UniverseNet: the 2nd Network School and Meeting, "Seeking links between fundamental physics and cosmology", Oxford (UK).
- Neutrino Oscillation Workshop 2008, Otranto (LE), Italy.
- 3rd Stueckelberg Workshop on Relativistic Field Theories, Pescara, Italy

2007

- Royal Astronomical Society Specialist Discussion Meeting: "Statistical challenges in particle astrophysics and cosmology", London, UK
- Institute of Physics **"**Theta13 half day meeting", Oxford, UK
- 2nd Meeting of the "Red Nacional Temática de Astroparticulas" (RENATA), Valencia, Spain
- Workshop "The Path to Neutrino Mass", Aarhus, Denmark.
- 4rd Italian-Sino Workshop on Relativistic Astrophysics: "Astrophysics at z>6", Pescara, Italy.
- 10th Italian-Korean Symposium on Relativistic Astrophysics, Pescara, Italy.
- XIXèmes Rencontres de Blois: "Matter and Energy in the Universe: from nucleosynthesis to cosmology", Blois, France.

2006

- 1st Meeting of the "Red Nacional Temática de Astroparticulas" (RENATA), Valencia, Spain

- 11th Marcel Grossmann Meeting on General Relativity, Berlin, Germany
- 3rd Italian-Sino Workshop on Relativistic Astrophysics: "Supernovae, GRBs and Cosmology", Pescara, Italy.
- International School on Astro-Particle Physics: "Neutrinos in Physics, Astrophysics and Cosmology", Munich, Germany.

2005

- IRAP Ph.D. School in Pescara, Italy.
- "Albert Einstein Century" International Conference, Paris, France
- 2nd Italian-Sino Workshop on Relativistic Astrophysics: "Probing the Dark Universe", Pescara, Italy

2004

- "Testing the equivalence principle in space and on ground" meeting, Pescara, Italy.
- 1st Sino-Italian Workshop on Cosmology and Relativistic Astrophysics, Pescara, Italy

2003

- "VIII Italian-Korean Symposium on Relativistic Astrophysics", Pescara, Italy
- "X Marcel Grossman Meeting on General Relativity", Rio de Janeiro, Brazil.

2002

- "X Brazilian School of Cosmology and Gravitation", Rio de Janeiro, Brazil.
- X ICRA Network Workshop on 'Black Holes, Gravitational Waves and Cosmology', Roma and Pescara, Italy.
- "Science and Ultimate Reality Symposium" in honour of J. A. Wheeler, Princeton N.J.

2001

- XI ICRA Network Workshop on 'Fermi and Astrophysics', Pescara, Italy.
- VII Italian-Korean Meeting on Relativistic Astrophysics, Inje University, South Korea.
- VI ICRA Network Workshop on 'Time Structures in Relativistic Astrophysics', Pescara, Italy.

Work With Students

Teaching Experiences:

2005 *Lecturer*: IRAP Doctorate School, Pescara, Italy

Delivered a lecture on the thermodynamics in the expanding Universe.

2002 *Postgraduate Teaching Assistant*: University of Rome 'La Sapienza'

Physics Laboratory. Supervised lab sessions, graded papers and exams.

2001 – 2005 *Substitute Lecturer*: University of Rome 'La Sapienza'

Delivered several lectures to the advanced general relativity class on the evolution of metric perturbations in a Friedmann Universe.

Work with graduate students

At the moment, he is following IRAP Ph.D. student Stefania Pandolfi, working on the statistical analysis of cosmological data. He is also collaborating with Luca Izzo on the possibility of using GRBs as standard candles.

In the past, he has been working with graduate students from different institutions, including D. Cumberbatch (Oxford), U. França (Valencia), I. Milillo (Rome and Portsmouth), S. Riemer-Sørensen (Aarhus).

Diploma thesis supervision

He followed as an adjoint supervisor Roberto Guida, now an IRAP PhD graduate, during its diploma thesis work, titled "Fractality and cosmological initial conditions: the role of the velocity field" (graduation date 30/9/04).

III Service activities

Within ICRANet

2005 Research Assistant, ICRANET

Outside ICRANet

2009 – Present Postdoctoral Fellow, ICRA and Physics Dept. "Sapienza" University, Rome (IT)

2007 – 2008 Postdoctoral Fellow, Physics Department, Oxford University (UK)

2006 Postdoctoral Fellow, Institute For Particle Physics, Valencia (ES)

2009 List of Publications

Submitted papers

D. Cumberbatch, M. Lattanzi, J. Silk, submitted to Phys. Rev. D [arxiv:0808.0881] [astro-ph]
Signatures of clumpy dark matter in the global 21 cm background signal

Published papers

U. França, M. Lattanzi, J. Lesgourgues, S. Pastor, Phys. Rev. D **80**, 083506 (2009) [arxiv:0908.0534][astro-ph.CO]
Model-independent constraints on mass-varying neutrinos scenarios

M. Lattanzi, J. Silk, Nucl. Phys. B (Proc. Suppl.) **194**, 162 (2009).
The impact of halo substructure on dark matter signatures

L. Pieri, M. Lattanzi, J. Silk, MNRAS in press [arxiv:0902.4330] [astro-ph]
Constraining the Sommerfeld enhancement with Cherenkov telescope observations of dwarf galaxies

M. Lattanzi, to appear in in "Proceedings of the Third Stueckelberg Workshop on Relativistic Field Theories", Eds. N. Carlevaro, G. Vereshchagin.
Enhancement of the dark matter annihilation cross section in the low-velocity regime

M. Lattanzi, J. Silk, Phys. Rev. D **79**, 083523 (2009) [arxiv:0812.0360] [astro-ph].
Can the WIMP annihilation boost factor be boosted by the Sommerfeld enhancement?

M. Lattanzi, Nucl. Phys. B (Proc. Suppl.) **188**, 40 (2009).
Mass-varying neutrinos: a model independent approach.

M. Lattanzi, to appear in J. Kor. Phys. Soc.. (in press).
The majoron: a new dark matter candidate

Rotondo Michael

Position: postdoctoral researcher

Period covered: 2008-2010

I Scientific Work

Supercritical electric fields in nuclei and neutron stars

II Conferences and educational activities
Conferences and Other External Scientific Work

APS April Meeting, St.Louis, Missouri (USA), 11-15 April, 2008.

3rd E.C.G. Stueckelberg Workshop, Pescara, Italy, 7-19 July, 2008.

6th Italian-Sino Workshop, Pescara, Italy, 29 June-1 July, 2009.

12th Marcel Grossmann Meeting on General Relativity, 13-18 July, 2009.

2009 List of Publications

Ruffini R., Rotondo M., Xue S.-S., Bull. Am. Phys. Soc., Vol. 53, No.5, April 2008, (8HE 00094).

Rotondo M., Ruffini R., Xue S.-S., Bull. Am. Phys. Soc., Vol. 53, No.5, April 2008, (8HE 00095).

Rueda J.A.H., Patricelli B., Rotondo M., Ruffini R., Xue S.- S., Bull. Am. Phys. Soc., Vol. 53, No.5, April 2008, (8HE 00093).

Patricelli B., Rotondo M., Ruffini R., Bull. Am. Phys. Soc. Vol. 53, No.5, April 2008, (8HE 00092).

Patricelli B. , Rotondo M., Rueda J. A. H. and Ruffini R., AIP Conference Proceedings, Vol. 1059 (2008), pp. 68-71.

Ruffini R., Bernardini M. G., Bianco C. L., Caito L., Chardonnet P., Cherubini C., Dainotti M.G., Fraschetti F., Geralico A., Guida R.,Patricelli B., Rotondo M., Rueda Hernandez J.A., Vareshchagin G., Xue S.-S., in the "Proceedings of the eleventh Marcel Grossmann meeting", R. Janzen, H. Kleinert, R. Ruffini (eds.), World Scientific (Singapore, 2008, arXiv:0804.2837v1), p. 368.

Rotondo M.,Ruffini R., Xue S.-S., in the "Proceedings of the eleventh Marcel Grossmann meeting", R. Janzen, H. Kleinert, R. Ruffini (eds.), World Scientific (Singapore, 2008), p.1352.

Ruffini R., Bernardini M. G., Bianco C. L., Caito L., Chardonnet P., Cherubini C., Dainotti M.G., Fraschetti F., Geralico A., Guida R., Patricelli B., Rotondo M., Rueda J.H. A., Vareshchagin G., Xue S.-S.$, AIP Conf. Proc., Vol. 1132: 199-266, 2009.

Rueda J.A.H., Rotondo M., Ruffini R. and Xue S.-S., in Proceedings of the Third Stueckelberg Workshop, N. Carlevaro and G. W. Vereshchagin (eds.), (Cambridge, 2009, in press).

Rotondo M., Ruffini R., Xue S.-S., in Proceedings of the Third Stueckelberg Workshop, N. Carlevaro and G. W. Vereshchagin (eds.), (Cambridge, 2009, in press).

Popov V., Rotondo M., Ruffini R., Xue S.-S., 2009 (submitted to Phys. Rev. C).

Rotondo M., Rueda J.A.H., Ruffini R., Xue S.-S., 2009 (submitted to Phys. Rev. D).

Short-Term Visiting Scientists

Ahmedov Bobomurat

Position: Project Leader/Professor

I Scientific Work

My main duty is to carry out the theoretical research in the field of electrodynamics of continuous media in general relativity and relativistic astrophysics and observational research on GPS and VLF data analysis for ionospheric disturbances caused by various atmospheric, terrestrial and extraterrestrial phenomena. At present I am holding a position of Projects Leader and Head of Sector of Theoretical Astrophysics (affiliated to the AS-ICTP as PRJ-29) in the Institute of Nuclear Physics, position of Leading Researcher and Projects Leader (part time) at the Ulugh Beg Astronomical Institute in Tashkent and position of Full Professor (part time) at the Uzbekistan National University in Tashkent and Tashkent Pedagogical University. I was co-organizer of Int. Symposium on Experimental Gravitation held in Samarkand, Uzbekistan, 1999. I am delivering lectures to graduate students at Samarkand State University starting year 1993 and at Uzbekistan National University, Tashkent from year 2000. I plan to give lectures at the Tashkent Pedagogical University starting this year. I am a key person being responsible for Uzbekistan in AS-ICTP Network on Relativity, Astrophysics and Cosmology between Bangladesh, India, Pakistan, Turkey and Uzbekistan (BIPTUN). I am Vice-Chairman of Scientific Council D.067.02.13 awarding PhD/DrSc degrees in Astrophysics and Radioastronomy & Theoretical Physics at the Uzbekistan National University and have full responsibility for PhD/DrSc dissertation defenses in Astrophysics and Radioastronomy in Uzbekistan. I am member of Scientific Councils at the Ulugh Beg Astronomical Institute and at the Institute of Nuclear Physics, Tashkent.

My research is mainly devoted to the general-relativistic electrodynamics of continuous media such as superconductor, conductor, plasma etc and its application for theoretical explanation and analysis of EM (electromagnetic) and astrophysical processes in the external gravitational fields. Experimental tests of general relativity, general relativistic EM effects and fields for pulsars and magnetized rotating and oscillating neutron stars are also in my scientific interests. Recently I have started a research on VLF (very low frequency) EM wave propagation in Earth ionosphere and study of the ionospheric disturbances caused by various atmospheric, terrestrial and extraterrestrial phenomena.

RESUME OF CURRENT RESEARCH

The basic equations of the GR EM fields in plasma magnetosphere of an oscillating magnetized neutron star have been formulated. The GR boundary conditions for discontinuities of EM fields at the surface of oscillating star are obtained. The Maxwell equations are investigated under the assumption of quasistationarity and low current approximation in plasma magnetosphere around oscillating relativistic star. Expressions for interior EM fields of a relativistic oscillating spherical star inside the perfectly conducting crust of oscillating magnetized star in the interior Schwarzschild

metric in case of infinite conductivity are obtained. General relativistic expressions for the EM fields interior of oscillating conducting crust of magnetized NS with polytrophic equation of state have been found.

Numerical solutions for space charge density and electric field in plasma magnetosphere for various modes of toroidal and spheroidal oscillations of Schwarzschild star have been obtained. The results justify that near the surface of oscillating magnetized neutron star the space charge density and electric field will be modified by the strong gravitational field. GR effects lead to shrinking of the size of the polar cap and an increase in the energy density of the outflowing plasma. These effects act in opposite directions but the net result is that the energy loss from the NS is significantly smaller than suggested by the Newtonian treatment.

The impact that stellar oscillations have on electric and magnetic fields external to a relativistic magnetized star in vacuum has been investigated. Modelling the star as a relativistic polytrope with infinite conductivity, the solution of the general relativistic Maxwell equations both in the vicinity of the stellar surface and far from it has been found. The general relativistic energy loss through EM radiation for different type (radial, toroidal and spheroidal) oscillations of relativistic magnetized stars has been calculated. GR corrections to EM fields lead to a damping timescale due to EM losses which is at least one order of magnitude smaller than its Newtonian counterpart; the emission of GW represents the most efficient mechanism for the damping of p- and f-mode oscillations; EM losses represents the most efficient mechanism for the damping of g-mode oscillations.

The dipolar magnetic field configuration in dependence on brane tension and present solutions of Maxwell equations in the internal and external background spacetime of a magnetized spherical star in a Randall-Sundrum II type braneworld. The star is modelled as sphere consisting of perfect highly magnetized fluid with infinite conductivity and frozen-in dipolar magnetic field. With respect to solutions for magnetic fields found in the Schwarzschild spacetime brane tension introduces enhancing corrections both to the interior and the exterior magnetic field. These corrections could be relevant for the magnetic fields of magnetized compact objects as pulsars and magnetars and may provide the observational evidence for the brane tension through the modification of formula for magneto-dipolar emission which gives amplification of EM energy loss up to few orders depending on the value of the brane tension.

Analytical solutions of Maxwell equations in background spacetime of BH (black hole) in braneworld immersed in external uniform magnetic field have been found. Influence of both magnetic and brane parameters on effective potential of the radial motion of charged test particle around slowly rotating in braneworld immersed in uniform magnetic field has been investigated by using Hamilton-Jacobi method. Exact analytical solution for dependence of the radius of the innermost stable circular orbits (ISCO) from brane parameter for motion of test particle around nonrotating isolated black hole in braneworld has been derived. It has been shown that radius ISCO is monotonically growing with the increase of module of brane tidal charge. Comparison of the predictions on ISCO radius of the brane world model and of the observational results of ISCO from relativistic accretion disks around black holes provided upper limit for brane tidal charge.

Analytic general relativistic solutions for the EM fields external to a slowly-rotating magnetized NUT star with nonvanishing gravitomagnetic charge are found. It is shown that the general relativistic corrections due to gravitomagnetic charge are not present in the form of the stationary magnetic fields but emerge only in the form of the electric fields. The gravitomagnetic charge provides an additional induced EF being analogous to the one introduced by the rotation of the star in the flat spacetime limit.

The general relativistic Ohm's law for the conduction current where the gravitomagnetic terms are incorporated has been derived. Then it is applied to predict a new galvano-gravitomagnetic effect, which takes place when a current carrying conductor is placed in a gravitomagnetic field. In connection with this galvano¬gravitomagnetic effect, the possibility of using current carrying conductors for detecting the Lense-Thirring field of the Earth was explored.

The general relativistic formula for charge distribution inside conductors has been derived from the Maxwell equations with the help of constitutive relations. The measurements of the general relativistic effect of charge redistribution inside conductors which can be performed within a conductor in the presence of gravitational field of a slow rotating metric source and an applied magnetic field both are proposed. It is shown that superconducting quantum interferometers could not detect the gravitomagnetism in the space of charged capacitor since they measure the quantity including the sum of electric and magnetic fields, and the general-relativistic magnetic part will be totally cancelled by the electric one which is in agreement with the experiments.

The appearance of general-relativistic contribution to the magnetic flux through a superconducting thermoelectric bimetallic circuit is shown. A response of the Josephson junctions to a heat flow is investigated in the general¬relativistic framework. Some gravitothermoelectric effects which can be observed in the superconducting state in the earth's gravitational field are considered.

Analytic solutions of Maxwell equations in the internal and external background spacetime of a slowly rotating misaligned magnetized neutron star have been obtained. With respect to a flat spacetime solution, general relativity introduces corrections related both to the monopolar and the dipolar parts of the gravitational field. In particular, in the case of infinite electrical conductivity general relativistic corrections due to the dragging of reference frames are present, but only in the expression for the electric field. In the case of finite electrical conductivity, however, corrections due both to the spacetime curvature and to the dragging of reference frames are shown to be present in the induction equation, which could be relevant for the evolution of the magnetic fields of pulsars and magnetars.

Electrostatic plasma modes along the open field lines of a rotating neutron star and Goldreich-Julian charge density in general relativity are analyzed for the neutron star with zero inclination. It is found that the charge density is maximum at the polar cap and it remains almost same in certain extended region of the pole. For a steady state Goldreich-Julian charge density the usual plasma oscillation along the field lines are found; plasma frequency resembles to the gravitational redshift close to the Schwarzchild radius. The nonlinear plasma mode along the field lines is studied. From the system of equations under general relativity, a second order differential equation is derived. The equation contains a term which describes the growing plasma modes near Schwarzchild radius in a black hole environment. The term vanishes with the distance far away from the gravitating object.

For initially zero potential and field on the surface of a neutron star, Goldreich-Julian charge density is found to create the plasma mode, which is enhanced and propagates almost without damping along the open field lines.

The equations that describe the EM processes in a plasma surrounding a neutron star are obtained by using the general relativistic form of Maxwell equations in a geometry of slow rotating gravitational object. A new mechanism of the generation of azimuthal current under the gravitomagnetic effect on radial current in a plasma around neutron star is predicted. The azimuthal current being proportional to the Lense-Thirring angular velocity can give valuable contribution on the evolution of the stellar magnetic field in some cases and therefore in general relativity a rotating neutron star, embedded in plasma, can in principle generate axial-symmetric magnetic fields even in axisymmetry.

The influence of the general-relativistic effects on charge distribution inside neutron star is investigated. The qualitative distinction of space charge distribution inside conducting crust from that inside superconducting core allows us to propose a possible mechanism of radio-wave radiation produced inside pulsar. A possibility of modelling this radiation in laboratory experiments in rotating frame of reference is analyzed.

It has been proposed that ionospheric disturbances before earthquakes, may have influence on the propagation of radio waves and, therefore, be precursors of EM signals detectable from ground- and space-based measurements. Analytical solution for the electric current arising in the lower ionosphere due to ejection of charged aerosols from the ground before earthquake is found and energy losses of the EM wave propagating through this layer of ionosphere are explored. Corrections to the "group delay" of the EM wave, Faraday rotation of the polarization plane and Doppler frequency shift, caused by electron density inhomogeneities induced in the higher layers of the ionosphere before earthquakes are studied.

On 22-Aug-2008 an earthquake with magnitude M=6.5 occurred in Tashkent, Uzbekistan where from May 2008 a VLF radio receiver provided by the STAR Laboratory of Stanford University is into operation. The raw analysis of VLF radio paths revealed a clear increase in the amplitude of the radio signals exactly at the time of the earthquake occurrence. Data from two GPS stations operated by Ulugh Beg Astronomical Institute and located in Tashkent and Kitab has been analyzed for possible earthquake ionospheric precursors. TEC (total electron content in ionosphere) time series over both sites are produced and applied to detect anomalous TEC signals accompanying the earthquakes. Anomalous TEC signals and significant correlation in time between these TEC anomalies and the occurrence of earthquake in Tashkent on 22-Aug-2008 have been detected. The deflection amplitude of maximum value of TEC over Tashkent reached about 20-30 with compare to the nondisturbed initial monthly mean background value one day before and after the earthquake. Exactly at the time of the earthquake occurrence TEC drastically dropped and came back near to the typical value after about 5 hours. This result does prove the possibility of precursory phenomena and show that the TEC precursor signature is enough to be detected by the GPS data analysis techniques. The localness of seismo-ionospheric TEC variation is demonstrated by the fact that no essential deflection was observer over Kitab GPS station which is at the distance of about 300 km from the epicenter.

II Conferences and educational activities

Conferences and Other External Scientific Work

The First IHY Int. Workshop on Advancing Very Low Freq.(VLF) Science Through the Global AWESOME Network, Tunis 2009
2nd Int Conf & Advances School Turbulent Mixing and Beyond, AS-ICTP, Trieste, Italy 2009
Summer College on Plasma Physics, AS-ICTP Trieste, Italy

Work With PhD Students

Ahmadjon Abdujabbarov, PhD Defence, Uzbekistan National University, Tashkent, June 18, 2009, Particle Motion and Electromagnetic Fields of Axial Symmetric Compact Objects in General Relativity

Viktoriya Giryanskaya, PhD Defence, Uzbekistan National University, Tashkent, March, 2010 (expected), Effects of General Relativity for Axial Symmetric Gravitational Models and Their Application to Astrophysics of Compact Objects

Rakhmatov Nemat, PhD Defence, Uzbekistan National University, Tashkent, 2010 (expected), General Relativistic Observable Macroscopic Effects in Electrodynamics

Diploma thesis supervision

Viktoriya Giryanskaya, MSc Defence, Uzbekistan National University, Tashkent, 2009, Plasma modes along open field lines of magnetized neutron stars

Abdikamalov Ernazar, MSc Defence, Uzbekistan National University, Tashkent, 2005, General Relativistic Plasma Magnetosphere of Magnetized Oscillating Stars

Kagramanova Valeria, MSc Defence, Uzbekistan National University, Tashkent, 2006, Observable Effects of General Relativity in Stationary Gravitational Fields

Fattoyev Farrukh, MSc Defence, Uzbekistan National University, Tashkent, 2004, Quasistationary Electromagnetic Effects in Gravitational Field

Rakhimov Ozodbek, MSc Defence, Uzbekistan National University, Tashkent, 2008, Particle Motion in Stationary Axial Symmetric Gravitational Field

Abdujabbarov Ahmadjon, MSc Defence, Uzbekistan National University, Tashkent, 2007, Thermoelectric Instability in Magnetized Neutron Stars

Slava Giryanskiy, MSc Defence, Uzbekistan National University, Tashkent, 2009, Electromagnetic fields of oscillating magnetized relativistic stars

Sardor Tojiev, MSc Defence, Uzbekistan National University, Tashkent, June, 2010 (expected), Electromagnetic Ionospheric Phenomena and Monitoring of F and D Layers of Ionosphere of Earth

Sanjar Shaymatov, MSc Defence, Uzbekistan National University, Tashkent, June, 2010 (expected), VLF (Very Low Frequency Electromagnetic Waves) Data Analysis in MatLab Programming

Other Teaching Duties

Teaching Experience

Winter-spring term 2009: Course in Statistical Physics and Thermodynamics, II part (66 lecture hours) for the 4th year undergraduate students (Bachelor Course), Chair of Theoretical Physics, Faculty of Physics, Uzbekistan National University, Tashkent, Uzbekistan.

Winter-spring term 2009: Course in General Relativity and Gravitation (50 lecture hours) for the 1st year graduate students (Master Course), Chair of Theoretical Physics, Faculty of Physics, Uzbekistan National University, Tashkent, Uzbekistan.

Winter-spring term 2009: Course in Statistical Physics and Thermodynamics (66 lecture hours) for the 3rd year undergraduate students (Bachelor Course), Chair of Theoretical Physics, Faculty of Physics, Uzbekistan National University, Tashkent, Uzbekistan.

Fall term 2009: Course in Statistical Physics and Thermodynamics, I part (60 lecture hours) for the 4th year undergraduate students (Bachelor Course), Chair of Theoretical Physics, Faculty of Physics, Uzbekistan National University, Tashkent, Uzbekistan.

Fall term 2009: Course in General Relativity and Cosmology (75 lecture hours) for the 1th year graduate students (Master Course), Chair of Astronomy, Faculty of Physics and Mathematics, Tashkent Pedagogical University, Uzbekistan.

Fall term 2009: Course in Basics of Cosmic Electrodynamics, I part (83 lecture hours) for the 1th year graduate students (Master Course), Chair of Astronomy, Faculty of Physics and Mathematics, Tashkent Pedagogical University, Uzbekistan.

Winter-spring term 2010: Course in Statistical Physics and Thermodynamics, II part (66 lecture hours) for the 4th year undergraduate students (Bachelor Course), Chair of Theoretical Physics, Faculty of Physics, Uzbekistan National University, Tashkent, Uzbekistan.

Winter-spring term 2010: Course in General Relativity and Gravitation (50 lecture hours) for the 1st year graduate students (Master Course), Chair of Theoretical Physics, Faculty of Physics, Uzbekistan National University, Tashkent, Uzbekistan.

Winter-spring term 2010: Course in Basics of Cosmic Electrodynamics, II part (84 lecture hours) for the 1th year graduate students (Master Course), Chair of Astronomy, Faculty of Physics and Mathematics, Tashkent Pedagogical University, Uzbekistan.

Other

AS-ICTP Regular Associate, Trieste, Italy, 2005-2010

Leader of 4.5 Years Research Project *"Study of the Equations of Electromagnetic and Gravitational Fields in Relativistic Astrophysics and Cosmology"* from the Uzbekistan Academy of Sciences, Grant FA-F2-F079, Tashkent, Uzbekistan (1 July 2007 - 31 December 2011).

Co-Leader of 4.5 Years Research Project *"Study of Gravitational Lenses, Formed Galaxies and Generalized Gravitational Models"* from the Uzbekistan Academy of Sciences, Grant FA-F2-F061, Tashkent, Uzbekistan (1 July 2007 - 31 December 2011).

Co-Leader of 3 Years Research Project *"Monitoring of Very Low Frequency Signals in Earth Ionosphere for Prognosis of Dangerous Tectonic Phenomena"* from the Uzbekistan Academy of Sciences, Grant FA-A17-077, Tashkent, Uzbekistan (1 January 2009 - 31 December 2011).

Leader of 2 Years Research Project *"General Relativistic Effects in Axial Symmetric Spacetimes"* from the Foundation for Fundamental Studies of the Uzbekistan Academy of Sciences, Grant #5-08, Tashkent, Uzbekistan (1 January 2008 - 31 December 2009).

DAAD (Germany) Grant A/09/04164 , 2009

Vice-Chairman of Scientific Council D.067.02.13 awarding PhD/DrSc degrees in Astrophysics and Radioastronomy & Theoretical Physics at the Uzbekistan National University (starting January 2009).

2009 List of Publications

Abdikamalov E.B., **Ahmedov B.J.,** and Miller J.C., The Magnetosphere of Oscillating Neutron Stars in General Relativity, **Mon. Not. R. Astron. Soc.,** 2009, Vol. 395, Issue 10, pp. 443-461.

Ahmedov B.J. and Morozova V.S. "Plasma Magnetosphere Formation Around Oscillating Magnetized Neutron Stars", **Astrophys. Space Sci.**, 2009, V. 319, 115-117.

B.V. Turimov, **B.J. Ahmedov,** A.A. Abdujabbarov, Electromagnetic Fields of Slowly Rotating Magnetized Gravastars, **Modern Physics Letters A**, 2009, V. 24, No. 10, 733-737.

A.A. Abdujabbarov, **B.J. Ahmedov** Electromagnetic Fields and Charged Particle Motion Around Magnetized Wormholes, **Astrophys. Space Sci.**, 2009, V. 321, 225–232.

V. Morozova and **B.J. Ahmedov,** Quantum Interference Effects in Slowly Rotating NUT Space-time, **Int. J. Mod. Phys. D**, 2009, V.18, No.1, pp. 107-119.

A.A. Abdujabbarov, **B.J. Ahmedov,** Charged Particle Motion Around Rotating Black Hole in Braneworld Immersed in Magnetic Field, **Phys. Rev. D**., 2009, submitted.

Ansoldi Stefano

Position: Researcher, University of Udine (Italy)

I Scientific Work

Dynamics of relativistic shells

Universe creation and Inflation

Non-singular solutions of Einstein equations

Member of the MAGIC collaboration

II Conferences and educational activities

Conferences and Other External Scientific Work

12th Marcel Grossmann Meeting (Paris, 12-18 July 2009)

Work With Students

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

Diploma thesis supervision

Alessandro Tomas, Department of Astronomy, University of Padova, Italy, “Tunneling probabilities for universe formation out of almost empty space” (in progress)

Other Teaching Duties

General Relativity, Master in Computational Physics, University of Udine, Italy

Statistical Mechanics, Master in Computational Physics, University of Udine, Italy

Analytical Mechanics (Meccanica Razionale 1) , Undergraduate course in Mathematics, University of Udine

Advanced Mechanics (Meccanica Razionale 2), Undergraduate course in Mathematics, University of Udine

Work With Postdocs

Victor G. Czinner, Theoretical Physics Center for Science Facilities, Institute of High Energy Physics, Chinese Academy of Sciences, China, “A Double Junction Model for Thick Shell Dynamics” (in progress)

2009 List of Publications

“Universes out of almost empty space”, Stefano Ansoldi, Eduardo I. Guendelman, Prog.Theor.Phys.120:985-993,2008

“A Double Junction Model for Thick Shell Dynamics”, Stefano Ansoldi, Viktor G. Czinner, in preparation

“Non singular cosmology from ‘Egg-type’ actions”, Stefano Ansoldi, Eduardo I. Guendelman, H. Ishihara, in preparation

Boshkayev Kuantay

Position: PhD student

Period covered: from 21.03-16.05.2009, 1.07.-1.09.2009

I Scientific Work

General Relativity (GR), body motion problems in GR, equations of translational and rotational motions of extended bodies, extended first approximation Fock metric.

Teacher of Mathematical Physics, Vector and Tensor calculus, Quantum Mechanics

2009 List of Publications

1. Brisheva Zh.N., Boshkayev K.A. «On unambiguity problem in two rotary bodies problem»// Proceedings of International congress of students, masters and young scientists devoted to 75 year-old anniversary of Al-Farabi Kazakh National University. Almaty, 2009. P. 3.

2. Boshkayev K.A., Brisheva Zh.N. «The metric of a rotating liquid sphere taking into account nonlinear terms in U and $\vec{S}_0$»// Proceedings of International congress of students, masters and young scientists devoted to 75 year-old anniversary of Al-Farabi Kazakh National University. Almaty, 2009. P. 13. (in Russian)

3. Abdildin M.M., Abishev M.E., Beissen N.A., Boshkayev K.A. «On the Uniqueness Problem for the Metric of the First Approximation in General-Relativistic Mechanics»// Gravitation and Cosmology, 2009. - Vol. 15, №. 1. - P. 1–4.

4. Abdil'din M.M., Beissen N.A., Boshkayev K.A., Taukenova A.S. «Velocity as a state function in GR mechanics»// Vestnik KazNU. 2009. №1(28). P. 89-92. (in Russian)

5. Abdil'din M.M., Abishev M.E., Beissen N.A., Boshkayev K.A. «Unambiguity of Lagrange function of two rotating bodies and first approximation metric in GR»//Vestnik KazNU. 2009. №1(28). P. 93-96. (in Russian)

Manchester Richard N.

Position: Visiting Scientist

Period covered: 22-27 June, 2009

I Scientific Work

Discussions with ICRANet scientists on pulsars, gravitational waves and related issues.

Seminar presentation: Radio Pulsars and Gravitational Wave Detection

II Conferences and educational activities

12th Marcel Grossmann Meeting, Paris, 12-18 July 2009

2009 List of Publications

Refereed Publications:

Pellizzoni, A., Pilia, M., Possenti, A., Fornari, F., Caraveo, P., Del Monte, E., Mereghetti, S., Tavani, M., Argan, A., Trois, A., Burgay, M., Chen, A., Cognard, I., Costa, E., D'amico, N., Esposito, P., Evangelista, Y., Feroci, M., Fuschino, F., Giuliani, A., Halpern, J., Hobbs, G., Hotan, A., Johnston, S., Kramer, M., Longo, F., Manchester, R. N., Marisaldi, M., Palfreyman, J., Weltevrede, P., Barbiellini, G., Boffelli, F., Bulgarelli, A., Cattaneo, P. W., Cocco, V., D'ammando, F., Deparis, G., Di Cocco, G., Donnarumma, I., Fiorini, M., Froysland, T., Galli, M., Gianotti, F., Harding, A., Labanti, C., Lapshov, I., Lazzarotto, F., Lipari, P., Mauri, F., Morselli, A., Pacciani, L., Perotti, F., Picozza, P., Prest, M., Pucella, G., Rapisarda, M., Rappoldi, A., Soffitta, P., Trifoglio, M., Vallazza, E., Vercellone, S., Vittorini, V., Zambra, A., Zanello, D., Pittori, C., Verrecchia, F., Preger, B., Santolamazza, P., Giommi, P., & Salotti, L., "High-Resolution Timing Observations Of Spin-Powered Pulsars With The Agile Gamma-Ray Telescope" Apj, 691, 1618-1633 (2009)

Keith, M. J., Kramer, M., Lyne, A. G., Eatough, R. P., Stairs, I. H., Possenti, A., Camilo, F., & Manchester, R. N., "Psr J1753-2240: A Mildly Recycled Pulsar In An Eccentric Binary System" Mnras, 393, 623-627 (2009)

Abdo, A. A., Ackermann, M., Atwood, W. B., Baldini, L., Ballet, J., Barbiellini, G., Baring, M. G., Bastieri, D., Baughman, B. M., Bechtol, K., Bellazzini, R., Berenji, B., Bloom, E. D., Bonamente, E., Borgland, A. W., Bregeon, J., Brez, A., Brigida, M., Bruel, P., Burnett, T. H., Caliandro, G. A., Cameron, R. A., Caraveo, P. A., Casandjian, J. M., Cecchi, C., Charles, E., Chekhtman, A.,

Cheung, C. C., Chiang, J., Ciprini, S., Claus, R., Cohen-Tanugi, J., Cominsky, L. R., Conrad, J., Dermer, C. D., De Angelis, A., De Palma, F., Digel, S. W., Donato, D., Dormody, M., Do Couto E Silva, E., Drell, P. S., Dubois, R., Dumora, D., Edmonds, Y., Farnier, C., Favuzzi, C., Fleury, P., Focke, W. B., Frailis, M., Fukazawa, Y., Funk, S., Fusco, P., Gargano, F., Gasparrini, D., Gehrels, N., Germani, S., Giebels, B., Giglietto, N., Giordano, F., Glanzman, T., Godfrey, G., Grenier, I. A., Grondin, M.-H., Grove, J. E., Guillemot, L., Guiriec, S., Harding, A. K., Hayashida, M., Hays, E., Hughes, R. E., Jóhannesson, G., Johnson, A. S., Johnson, R. P., Johnson, T. J., Johnson, W. N., Johnston, S., Kamae, T., Katagiri, H., Kataoka, J., Kawai, N., Kerr, M., Knödlseder, J., Komin, N., Kramer, M., Kuehn, F., Kuss, M., Latronico, L., Lee, S.-H., Lemoine-Goumard, M., Longo, F., Loparco, F., Lott, B., Lovellette, M. N., Lubrano, P., Makeev, A., Marelli, M., Mazziotta, M. N., Mcconville, W., Mcenery, J. E., Meurer, C., Michelson, P. F., Mitthumsiri, W., Mizuno, T., Moiseev, A. A., Monte, C., Monzani, M. E., Morselli, A., Moskalenko, I. V., Murgia, S., Nolan, P. L., Nuss, E., Ohsugi, T., Omodei, N., Orlando, E., Ormes, J. F., Paneque, D., Panetta, J. H., Parent, D., Pepe, M., Pesce-Rollins, M., Piron, F., Porter, T. A., Rainò, S., Rando, R., Razzano, M., Reimer, A., Reimer, O., Reposeur, T., Ritz, S., Rochester, L. S., Rodriguez, A. Y., Romani, R. W., Roth, M., Ryde, F., Sadrozinski, H. F.-W., Sanchez, D., Sander, A., Parkinson, P. M. Saz, Sgrò, C., Siskind, E. J., Smith, D. A., Smith, P. D., Spandre, G., Spinelli, P., Starck, J.-L., Strickman, M. S., Suson, D. J., Tajima, H., Takahashi, H., Tanaka, T., Thayer, J. B., Thayer, J. G., Thompson, D. J., Thorsett, S. E., Tibaldo, L., Torres, D. F., Tosti, G., Tramacere, A., Uchiyama, Y., Usher, T. L., Van Etten, A., Vilchez, N., Vitale, V., Waite, A. P., Watters, K., Wood, K. S., Ylinen, T., Ziegler, M., Hobbs, G., Keith, M., Manchester, R. N., & Weltevrede, P. "Discovery Of Pulsed Γ-Rays From The Young Radio Pulsar Psr J1028-5819 With The Fermi Large Area Telescope" Apj, 695, L72-L77 (2009)

Hobbs, G., Jenet, F., Lee, K. J., Verbiest, J. P. W., Yardley, D., Manchester, R., Lommen, A., Coles, W., Edwards, R., & Shettigara, C., "Tempo2: A New Pulsar Timing Package - Iii. Gravitational Wave Simulation" Mnras, 394, 1945-1955 (2009)

Abdo, A. A., Ackermann, M., Atwood, W. B., Bagagli, R., Baldini, L., Ballet, J., Band, D. L., Barbiellini, G., Baring, M. G., Bartelt, J., Bastieri, D., Baughman, B. M., Bechtol, K., Bellardi, F., Bellazzini, R., Berenji, B., Bisello, D., Blandford, R. D., Bloom, E. D., Bogart, J. R., Bonamente, E., Borgland, A. W., Bouvier, A., Bregeon, J., Brez, A., Brigida, M., Bruel, P., Burnett, T. H., Caliandro, G. A., Cameron, R. A., Camilo, F., Caraveo, P. A., Casandjian, J. M., Ceccanti, M., Cecchi, C., Charles, E., Chekhtman, A., Cheung, C. C., Chiang, J., Ciprini, S., Claus, R., Cognard, I., Cohen-Tanugi, J., Cominsky, L. R., Conrad, J., Corbet, R., Corucci, L., Cutini, S., Davis, D. S., Deklotz, M., Dermer, C. D., De Angelis, A., De Palma, F., Digel, S. W., Dormody, M., Silva, E. Do Couto E., Drell, P. S., Dubois, R., Dumora, D., Espinoza, C., Farnier, C., Favuzzi, C., Flath, D. L., Fleury, P., Focke, W. B., Frailis, M., Friere, P. C. C., Fukazawa, Y., Funk, S., Fusco, P., Gargano, F., Gasparrini, D., Gehrels, N., Germani, S., Giannitrapani, R., Giebels, B., Giglietto, N., Giordano, F., Glanzman, T., Godfrey, G., Gotthelf, E. V., Grenier, I. A., Grondin, M.-H., Grove, J. E., Guillemot, L., Guiriec, S., Haller, G., Harding, A. K., Hart, P. A., Hartman, R. C., Hays, E., Hobbs, G., Hughes, R. E., Jóhannesson, G., Johnson, A. S., Johnson, R. P., Johnson, T. J., Johnson, W. N., Johnston, S., Kamae, T., Kanbach, G., Kaspi, V. M., Katagiri, H., Kataoka, J., Kavelaars, A., Kawai, N., Kelly, H., Kerr, M., Kiziltan, B., Klamra, W., Knödlseder, J., Kramer, M., Kuehn, F., Kuss, M., Lande, J., Landriu, D., Latronico, L., Lee, B., Lee, S.-H., Lemoine-Goumard, M.,

Livingstone, M., Longo, F., Loparco, F., Lott, B., Lovellette, M. N., Lubrano, P., Lyne, A. G., Madejski, G. M., Makeev, A., Manchester, R. N., Marangelli, B., Marelli, M., Mazziotta, M. N., Mcenery, J. E., Mcglynn, S., Mclaughlin, M. A., Menon, N., Meurer, C., Michelson, P. F., Mineo, T., Mirizzi, N., Mitthumsiri, W., Mizuno, T., Moiseev, A. A., Mongelli, M., Monte, C., Monzani, M. E., Moretti, E., Morselli, A., Moskalenko, I. V., Murgia, S., Nakamori, T., Nolan, P. L., Noutsos, A., Nuss, E., Ohsugi, T., Omodei, N., Orlando, E., Ormes, J. F., Ozaki, M., Paccagnella, A., Paneque, D., Panetta, J. H., Parent, D., Pearce, M., Pepe, M., Perchiazzi, M., Pesce-Rollins, M., Pieri, L., Pinchera, M., Piron, F., Porter, T. A., Rainò, S., Rando, R., Ransom, S. M., Rapposelli, E., Razzano, M., Reimer, A., Reimer, O., Reposeur, T., Reyes, L. C., Ritz, S., Rochester, L. S., Rodriguez, A. Y., Romani, R. W., Roth, M., Ryde, F., Sacchetti, A., Sadrozinski, H. F.-W., Saggini, N., Sanchez, D., Sander, A., Parkinson, P. M. Saz, Segal, K. N., Sellerholm, A., Sgrò, C., Siskind, E. J., Smith, D. A., Smith, P. D., Spandre, G., Spinelli, P., Stamatikos, M., Starck, J.-L., Stecker, F. W., Stephens, T. E., Strickman, M. S., Strong, A. W., Suson, D. J., Tajima, H., Takahashi, H., Takahashi, T., Tanaka, T., Tenze, A., Thayer, J. B., Thayer, J. G., Theureau, G., Thompson, D. J., Thorsett, S. E., Tibaldo, L., Tibolla, O., Torres, D. F., Tramacere, A., Turri, M., Usher, T. L., Vigiani, L., Vilchez, N., Vitale, V., Waite, A. P., Wang, P., Watters, K., Weltevrede, P., Winer, B. L., Wood, K. S., Ylinen, T., & Ziegler, M., "Fermi Large Area Telescope Observations Of The Vela Pulsar" Apj, 696, 1084-1093 (2009)

Keith, M. J., Eatough, R. P., Lyne, A. G., Kramer, M., Possenti, A., Camilo, F., & Manchester, R. N., "Discovery Of 28 Pulsars Using New Techniques For Sorting Pulsar Candidates" Mnras, 395, 837-846 (2009)

Hobbs, G. B., Bailes, M., Bhat, N. D. R., Burke-Spolaor, S., Champion, D. J., Coles, W., Hotan, A., Jenet, F., Kedziora-Chudczer, L., Khoo, J., Lee, K. J., Lommen, A., Manchester, R. N., Reynolds, J., Sarkissian, J., Van Straten, W., To, S., Verbiest, J. P. W., Yardley, D., & You, X. P., "Gravitational-Wave Detection Using Pulsars: Status Of The Parkes Pulsar Timing Array Project" Pasa, 26, 103-109 (2009)

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Brez, A., Brigida, M., Bruel, P., Burnett, T. H., Caliandro, G. A., Cameron, R. A., Camilo, F., Caraveo, P. A., Carlson, P., Casandjian, J. M., Cecchi, C., Çelik, Ö., Charles, E., Chekhtman, A., Cheung, C. C., Chiang, J., Ciprini, S., Claus, R., Cognard, I., Cohen-Tanugi, J., Cominsky, L. R., Conrad, J., Corbet, R., Cutini, S., Dermer, C. D., Desvignes, G., De Angelis, A., De Luca, A., De Palma, F., Digel, S. W., Dormody, M., Do Couto E Silva, E., Drell, P. S., Dubois, R., Dumora, D., Edmonds, Y., Farnier, C., Favuzzi, C., Fegan, S. J., Focke, W. B., Frailis, M., Freire, P. C. C., Fukazawa, Y., Funk, S., Fusco, P., Gargano, F., Gasparrini, D., Gehrels, N., Germani, S., Giebels, B., Giglietto, N., Giordano, F., Glanzman, T., Godfrey, G., Grenier, I. A., Grondin, M. H., Grove, J. E., Guillemot, L., Guiriec, S., Hanabata, Y., Harding, A. K., Hayashida, M., Hays, E., Hobbs, G., Hughes, R. E., Jóhannesson, G., Johnson, A. S., Johnson, R. P., Johnson, T. J., Johnson, W. N., Johnston, S., Kamae, T., Katagiri, H., Kataoka, J., Kawai, N., Kerr, M., Knödlseder, J., Kocian, M. L., Kramer, M., Kuss, M., Lande, J., Latronico, L., Lemoine-Goumard, M., Longo, F., Loparco, F., Lott, B., Lovellette, M. N., Lubrano, P., Madejski, G. M., Makeev, A., Manchester, R. N., Marelli, M., Mazziotta, M. N., Mcconville, W., Mcenery, J. E., Mclaughlin, M. A., Meurer, C., Michelson, P. F., Mitthumsiri, W., Mizuno, T., Moiseev, A. A., Monte, C., Monzani, M. E., Morselli, A., Moskalenko, I. V., Murgia, S., Nolan, P. L., Norris, J. P., Nuss, E., Ohsugi, T., Omodei, N., Orlando, E., Ormes, J. F., Paneque, D., Panetta, J. H., Parent, D., Pelassa, V., Pepe, M., Pesce-Rollins, M., Piron, F., Porter, T. A., Rainò, S., Rando, R., Ransom, S. M., Ray, P. S., Razzano, M., Rea, N., Reimer, A., Reimer, O., Reposeur, T., Ritz, S., Rochester, L. S., Rodriguez, A. Y., Romani, R. W., Roth, M., Ryde, F., Sadrozinski, H. F. W., Sanchez, D., Sander, A., Saz Parkinson, P. M., Scargle, J. D., Schalk, T. L., Sgrò, C., Siskind, E. J., Smith, D. A., Smith, P. D., Spandre, G., Spinelli, P., Stappers, B. W., Starck, J. L., Striani, E., Strickman, M. S., Suson, D. J., Tajima, H., Takahashi, H., Tanaka, T., Thayer, J. B., Thayer, J. G., Theureau, G., Thompson, D. J., Thorsett, S. E., Tibaldo, L., Torres, D. F., Tosti, G., Tramacere, A., Uchiyama, Y., Usher, T. L., Van Etten, A., Vasileiou, V., Venter, C., Vilchez, N., Vitale, V., Waite, A. P., Wallace, E., Wang, P., Watters, K., Webb, N., Weltevrede, P., Winer, B. L., Wood, K. S., Ylinen, T., & Ziegler, M., "A Population Of Gamma-Ray Millisecond Pulsars Seen With The Fermi Large Area Telescope" Science, 325, 848- (2009)

Potter, T. M., Staveley-Smith, L., Ng, C.-Y., Ball, Lewis, Gaensler, B. M., Kesteven, M. J., Manchester, R. N., Tzioumis, A. K., & Zanardo, G., "High Resolution 36 Ghz Imaging Of The Supernova Remnant Of Sn 1987a" Apj, 705, 261-271 (2009)

Smits, R., Lorimer, D. R., Kramer, M., Manchester, R., Stappers, B., Jin, C. J., Nan, R. D., & Li, D., "Pulsar Science With The Five Hundred Metre Aperture Spherical Telescope" A&A, 505, 919-926 (2009)

Book Chapter:

Manchester, Richard N., "Radio Emission Properties Of Pulsars" Assl, 357, 19-39, Berlin: Springer (2009)

Nagataki Shigehiro

Position: Associate Professor

Period covered: 24th SEP 2009 – 29th SEP 2009

I Scientific Work

I am studying Gamma-Ray Bursts.

At ICRANet, I gave a talk as below:

Title:
GRB-SN Connection: Central Engine of Long GRBs and Explosive Nucleosynthesis

Abstract:
I would like to present my recent study on collapsars and formation of jet with the General Relativistic MHD (GRMHD) code that I have developed(ApJ, accepted:arXiv:0902.1908). Also, I have developed a General Relativistic Force-Free (GRFFE) code by which Blandford-Znajek"s paraboloidal solution is reproduced well. I am going to discuss how important it is to develop a hybrid code that includes GRMHD and GRFFE codes toward understanding the central engine of a long GRB. Further, I have done numerical simulations on collapsars using ZEUS code by adding some microphysics such as a realistic equation of state and neutrino cooling/heating (Nagataki et al. ApJ 2007). Finally, I would like to talk about explosive nucleosynthesis in a collapsar (Nagataki et al. ApJ 2006), which can give a strict constraint on the central engine of a long GRB.

II Conferences and educational activities

Conferences and Other External Scientific Work

After the talk at ICRANet, I was asked to participate in the ‘Galileo - Xu Guangqi meeting (First)’ October 26-30, 2009 Shanghai (CHINA) by Prof. She Sheng Xue. So I participated in the meeting and gave a talk there.

2009 List of Publications

Papers in refereed journals:
K. Kotera, D. Allard, K. Murase, J. Aoi, Y. Dubois, T. Pierog, and S. Nagataki 'Propagation of Ultra-High energy Nuclei in Cluster of Galaxies: Resulting Composition and Secondary Emission' The Astrophysical Journal, accepted (arXiv:0907.2433)

S. Nagataki 'Development of General Relativistic Magnetohydrodynamic Code and its Application to Central Engine of Long Gamma-Ray Bursts ' The Astrophysical Journal, 704, 937-950 (2009)

Y. Fukui, N. Furukawa, T.M. Dame, J.R. Dawson, H. Yamamoto, G.P. Rowell, F. Aharonian, W. Hofmann, E. de Ona Wilhelmi, T. Minamidani, A. Kawamura, N. Mizuno, T. Onishi, A. Mizuno,

and S. Nagataki ‘A peculiar jet and arc of molecular gas toward the rich and young stellar cluster Westerlund 2 and a TeV gamma ray source’ Publication of Astronomical Society of Japan, accepted (arXiv:0903.5340).

K. Murase, B. Zhang, K. Takahashi, S. Nagataki 'Possible Effects of Pair Echos on Gamma-Ray Burst Afterglow Emission’, Monthly Notices of the Royal Astronomical Society accepted (arXiv:0812.0124).

H. Takami, K. Murase, S. Nagataki, K. Sato 'Cosmogenic Neutrinos as a Probe of the Transition from Galactic to Extragalactic Cosmic Rays' Astroparticle Physics 31, 201-211 (2009).

Y. Mizuno, B. Zhang, B. Giacomazzo, K. Nishikawa, P.E. Hardee, S. Nagataki, D.H. Hartmann ‘Magnetohydrodynamic Effects in Propagating Relativistic Jets: Reverse Shock and Magnetic Acceleration’, The Astrophysical Journal, accepted (arXiv:0810.2779)

K. Murase, S. Inoue, S. Nagataki ‘Cosmic Rays above the Second Knee from Clusters of Galaxies and Associated High-Energy Neutrino Emission’, The Astrophysical Journal Letter, accepted (arXiv:0805.0104)

K. Takahashi, K. Murase, K. Ichiki, S. Inoue, S. Nagataki

Papers submitted to refereed journals:
K. Murase, K. Toma, R. Yamazaki, S. Nagataki, K. Ioka ‘High-energy emission as a test of the prior emission model for gamma-ray burst afterglows’ The Astrophysical Journal, submitted (arXiv:0910.0232).

K. Hayasaki, K. Takahashi, Y. Sendouda, S. Nagataki 'Rapid Merger of Binary Primordial Black Holes: A New Approach for Supermassive Black-Hole Formation' Physical Review D submitted (arXiv:0909.1738).

J. Aoi, K. Murase, K. Takahashi, K. Ioka, S. Nagataki 'Can we probe the Lorentz factor of gamma-ray bursts from GeV-TeV spectra integrated over internal shocks?' The Astrophysical Journal, submitted (arXiv:0904.4878).

Y. Masada, S. Nagataki, K. Shibata, T. Terasawa 'Solar-type Theoretical Model for Magnetar Giant Flare' The Astrophysical Journal, submitted (arXiv:0803.3818).

Proceedings (international only):
Y. Mizuno, B. Zhang, B. Giacomazzo, K.-I. Nishikawa, P.E. Hardee, S. Nagataki, D.H. Hartmann ‘Magnetohydrodynamic Effects in Propagating Relativistic Ejecta: Reverse Shock and Magnetic Acceleration’ GAMMA-RAY BURST: Sixth Huntsville Symposium. AIP Conference Proceedings, Volume 1133, pp. 229-231 (2009).

Long-Term Visiting Scientists

Arkhangelskaja Irene

Position: senior researcher, assistant

at the Department of Nuclear Physics

and Cosmophysics of National Research Nuclear University “MEPhI”, Moscow

I Scientific Work

In the resent period Arkhangelskaja’s research includes investigation of GRB spectra, temporal profiles and the shape of GRB redshift and duration distributions. Also she analyze problem of high energy emission during GRB and solar flares including neural mesons production in pp interactions at high energies.

II Conferences and educational activities

Conferences and Other External Scientific Work

Conferences:

1) 11th European Solar Physics Meeting "The Dynamic Sun: Challenges for Theory and Observations" (ESA SP-600), Leuven, Belgium, 2005
2) International Symposium SEE 2007: Fundamental Science and Applied Aspects (2007, Athens, Greece)
3) XI Marcel Grossmann Meeting (2006, Berlin, Germany)
4) 37th COSPAR Scientific Assembly (2008, Montréal, Canada)
5) XII Marcel Grossmann Meeting (2009, Paris, France)

ICRANET seminar: 23/10/2008 High energy gamma-emission of GRBs observed in experiments on various satellites

Invited lectures:

The applicability of fractal analysis for GRB temporal profiles studying, Rome, 2005

A possibility of existence third GRB class - intermediate GRBs, Pescara, 2005

Work With Students

Lectures “Actual problems of Micro- and Cosmophysics” for five-year students in National Research Nuclear University “MEPhI”, Moscow, Russia

oral exams in the course of lectures “Actual problems of Micro- and Cosmophysics” (from 15 to 30 students, depends of year)

Rangel Lemos Luis Juracy (ICRA) - consultations

Diploma thesis supervision

Kolchina Maria (MEPhI) The investigation of faint solar flares on data of AVS-F apparatus onboard CORONAS-F satellite (2009-2010)

Amandzolova Dalia (MEPhI) The investigation of quasistationary equatorial precipitations on data of AVS-F apparatus onboard CORONAS-F satellite (2006-2007)

Kalmykov Pietr (MEPhI) The development of the software for processing of spectral information from scintillation detectors onboard CORONAS series satellites (2006-2007)

III Service activities

Within ICRANet

Member of International Coordinating Committee of Marcel Grossmann Meeting (2009)

Chair of section “Long GRB” on the XI Marcel Grossmann Meeting (2006)

Outside ICRANet

Secretary of section “Astrophysics and Cosmophysics” on the every year conference “Science Session MEPhI” (2007-

2009 List of Publications

Arkhangelskaja I.V., Arkhangelskiy A.I., Kotov Yu. D. et al. AVS-F observations of gamma-ray emission during January 20, 2005 solar flare up to 140 MeV, Advances in Space Research, v. 43, Issue 4, 2009, pp. 589-593

Arkhangelskaja I.V., Arkhangelskiy A.I., Kotov Yu. D. et al. Thin structure of temporal profiles of solar flares January 15, 17 and 20, 2005 by data of AVS-F apparatus onboard CORONAS-F satellite, Advances in Space Research, v. 43, Issue 4, , 2009, pp. 542-546.

Troitskaya E. V., Arkhangelskaja I.V., Arkhangelsky A. I. et al. Study of the 28 October 2003 and 20 January 2005 solar flares by means of 2.223 MeV gamma-emission line, Advances in Space Research, v. 43, Issue 4, 2009, pp. 547-552

Arkhangelskaja I.V., Troitskaya E. V., Arkhangelsky A. I. et al. The investigation of powerful solar flares characteristics by analysis of excited states of 12C and various neutrons capture lines, Advances in Space Research, v. 43, Issue 4, 2009, pp. 594-599

Goulart Érico

Position: Post-Doc ICRA-br, CBPF, Brasil

Period covered: 21/09/2009 – 17/10/2009

I Scientific Work

At the moment I am specially interested in the study of propagation properties in the context of nonlinear classical field theory. The problem is being investigated from the differential, algebraic and energetic points of view. The mechanism of the effective metric correlates all these properties in a very powerfull and elegant framework that I am formalizing and studying in details. This is because in a nonlinear context the causal structure of the field does not coincide with the Minkowskian one anymore i.e. the rays of radiation cannot be identified with the geodesics of Minkowski space-time. Neverthless, it is possible to show, from the study of the characteristics of the equations, that exists an effective Riemannian manifold in wich the null geodesics coincide with the trajectories of the nonlinear excitations.

Special emphasis is being given to the causal structure of nonlinear electrodynamics theories. This is because it is exactly the linear nature of Maxwell´s electrodynamics that determines the causal structure of the relativistic spacetime we think we know well. In nonlinear electrodynamics the situation is not so simple. These theories, although clearly formulated in a Lorentz covariant fashion do not admit, in general, a special velocity associated to the excitations that has an invariant meaning. In general the velocity of the high energy perturbations depends on the direction, magnitude and nature of the external electromagnetic field in which it propagates. Our studies show, for instance, that the propagation of the waves in a null electromagnetic background is entirely different from the propagation in backgrounds where the electromagnetic invariants do not vanish. Furthermore, because the orientation of the characteristics in spacetime is field dependent, we do not have the same light cone for all points, i.e. the propagation is not isotropic in general. To understand such features i developed a classification of propagation properties of nonlinear electrodynamics based on local properties of the effective metric (class. Quantum Grav. 26 (2009) 135015). I am studying some of its consequences and its relation with the polarization.

My next objectives are to apply the method of classification to investigate in details the electromagnetic propagation properties of high energy excitations in astrophysical situations and in cosmolgy. Beside of this, because nonlinear electrodynamics presents many interesting formal properties that may be geometrized, it can be used as tool to understand better processes associated to gravitation, such as gravitational waves, Lorentz invariance and the geometrization of the interaction itself.

Work With Postdocs

I had the opportunity to discuss a lot with prof. Herman Julio Mosquera Cuesta in ICRA-NET Pescara about the relevance of nonlinear electrodynamics to astrophysical processes and some other

fundamental issues. As i am thinking almost all of the time in theoretical and formal aspects of fields, gravitation and geometrization it was very uplifting to me. We will start a collaboration in some of the astrophysical aspects as soon as possible.

III Service activities

Within ICRANet

1) I was invited by prof. Novello to write a book with him emphasizing the fundamental issues that a nonlinear theory of electrodynamics implies. These aspects ranges from the causal structure of the field, differential aspects of the equations of motion, classification of the energy momentum tensor and effective metric, nonlinear properties of materials, exotic solutions for photon trajectories, analogue black-holes, some exact solutions and assymptotic properties, nonlinear electrodynamics coupled to general relativity to cosmological solutions and magnetic fields in the large. Most of the book was discussed and written in the very pleasant building of ICRA-net in Pescara. It will be published by CBPF (Brazilian Center of Physics) in December 2009.

2) Prof. Hernando Quevedo presented to me his efforts to understand Thermodynamics in terms of Geometry. I was very inspired by the beauty and conciseness of the framework in which he is still working. We discussed a little bit about the conditions and possibilities to do some studies together in the area of Geometrothermodynamics. As I am very interested in geometrization and analogies of nonlinear fields with gravity and propagation we are trying to start some collaboration also.

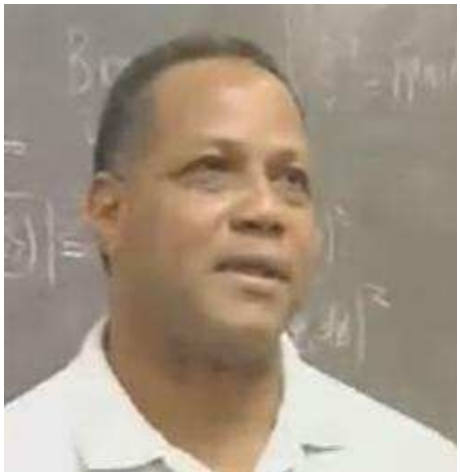
2009 List of Publications

Érico Goulart and Santiago E. P. Bergliaffa - A classification of the effective metric in nonlinear electrodynamics – class. Quantum Grav. 26 (2009) 135015;

Érico Goulart and Felipe Tovar Falciano – Formal analogies between gravitation and electrodynamics – Int. J. Mod. Phys. A, vol. 24, n. 24 (2009) 4589;

V. Antunes, E. Goulart and M. Novello – Gravitational Waves in singular and Bouncing Universes – Gravitation and Cosmology, 2009, vol. 15, n. 3, 191;

Mosquera Cuesta Herman Julio



Position: Visiting Professor ICRA-BR/Rio de Janeiro

Period covered: 18 September – 18 December 2009

I Scientific Work

PAPERS PUBLISHED IN 2009

Title: Bursts of Gravitational Waves Emitted During Ejection of Jet Superluminal Components in Active Galactic Nuclei Dynamically Dominated by Bardeen-Petterson Effect Authors: Mosquera Cuesta, Herman J.; Caproni, Anderson; Abraham, Zulema
Publication: AIP Conference Proceedings, Volume 1168, pp. 1094-1100 (2009).
NUMERICAL ANALYSIS AND APPLIED MATHEMATICS: International Conference on Numerical Analysis and Applied Mathematics 2009

Title: Primordial magnetic fields and gravitational baryogenesis in nonlinear electrodynamics Authors: Mosquera Cuesta, Herman J.; Lambiase, Gaetano
Publication: Physical Review D, vol. 80, Issue 2, id. 023013

Title: Warping and Precession in Extragalactic Maser Accretion Discs Authors: Caproni, A.; Abraham, Z.; Livio, M.; Mosquera Cuesta, H. J.
Publication: Revista Mexicana de Astronomía y Astrofísica (Serie de Conferencias) Vol. 35, pp. 58-59 (2009) (http://www.astroscu.unam.mx/~rmaa/) (RMxAC Homepage): XII Latin American IAU Regional Meeting (Eds. G. Magris, G. Bruzual, & L. Carigi)

Title: A spherically symmetric and stationary universe from a weak modification of general relativity Authors: Corda, C.; Mosquera Cuesta, H. J.
Publication: Europhysics Letters, Volume 86, Issue 2, pp. 20004 (2009)

Title: Neutrino mass spectrum from neutrino spin-flip-driven gravitational waves
Authors: Mosquera Cuesta, Herman J.; Lambiase, Gaetano
Publication: International Journal of Modern Physics D, v. 18, p. 435, 2009.

Title: Luminosity distance vs. proper distance: Effects of nonlinear electrodynamics in cosmology
Authors: Mosquera Cuesta, Herman J.; Salim, J. M.; Novello, M.
Publication: Proceedings of Science, v. ISFTG, p. PoS(ISFTG)009, 2009.

Title: L'energie sombre: Un mirage cosmique ? --- Luminosity distance vs. proper distance: A cosmological dissimilitude induced by nonlinear electrodynamics.
Author: Herman J. Mosquera Cuesta

Publication (To be published in: Proceedings of the International Conference: “Invisible Universe”, editor: Jean-Michel Alimi (AIP Conference Proceedings 2010).

Cosmological redshift and nonlinear electrodynamics propagation of photons from distant sources.
Author: Herman J.Mosquera Cuesta
Publication: To be published in the proceeding sof the Italo-Pakistanese Workshop on Relativistic Astrophysics 2009, Editors F. De Paolis, and A. Qhadir, General Relativity and Gravitation (2010)

II Participation of Conferences and Educational Activities

Conferences and Other External Scientific Work:

1) Sobral Meeting
May 26-29, 2009 Fortaleza (Ceará) Brazil

2) Italo-Pakistanese Meeting on Relativistics Astrophysics
ICRANet, July 07-10, 2009 - Pescara, Italia

3) XIIth Marcel Grossmann Meeting on General Relativity
Palais de l’Unesco, July 12-18, 2009 – Paris, France

4) Invisible Universe International Conference
Palais de l’Unesco, June 29 -July 03, 2009 – Paris, France

Work With Students (currently one student)

Co-advising the final phase of preparation of the Ph.D. Thesis Dissertation of graduate student :
Luis Juracy Rangel Lemos, advised by Prof. Remo Rufffini

Other Teaching Duties

Mini-Courses in “Programa Mínimo de Cosmologia ICRA-BR” (Minimun program for cosmology)

1) Astrofísica de Ondas Gravitacionais (Gravitational waves astrophysics)
Manaus, AM, Brasil (2009)

2) Astrofísica de Objetos Compactos (Astrophysics of compacts objects)
Manaus, AM, Brasil (2009)

New Scientific Collaborations

During 2009, I started a few new scientific collaborations with the following scientists:
Prof. Timothy C. Beers, Michigan State University, East Lansing, Michigan
Prof. Salvatore Capozziello, Uni-Napoli, Napoli, Italia
Prof. Luis A. Sanchez (Universidad Nacional de Colombia, Sede Medellin
And reinforced the existing ones with:
Prof. Gaetano Lambiase, Uni-Salerno, Salerno, Italia

Dr. Christian Corda, Associazione Scientifica Galileo Galilei, Prato, Italia
Dr. Jean-Paul Mbelek, Cea-Saclay, Paris, France

III Service activities

Within ICRANet

Conferences and Other External Scientific Work:

1) Sobral Meeting
May 26-29, 2009 Fortaleza (Ceará) Brazil

2) Italo-Pakistanese Meeting on Relativistic Astrophysics
ICRANet, July 07-10, 2009 - Pescara, Italia

3) XIIth Marcel Grossmann Meeting on General Relativity
Palais de l'Unesco, July 12-18, 2009 – Paris, France

Organization of International events

1) Sobral Meeting
May 26-29, 2009 Fortaleza (Ceará) Brazil

Outside ICRANet:

2) Lanzamiento del Ano Intenacional de la Astronomia 2009 en Colombia
Anuncio Oficial de la Abertura de Inscripciones para el Nuevo programa de Astronomia de la Universidad de Antioquia
Medellín, Colombia, Marzo 9-13 (2009)

V Other

1) Co-editor of the special issue on gravitational waves: " The big challenge of gravitational waves: A new window on to the Universe"
Editors: Christian Corda, Herman J. Mosquera Cuesta, Oswaldo D. Miranda
To be published by "The Open Astronomy and Astrophysics Journal", (TOAAJ) 2009

2) Editor of the book-review on: Nonlinear electrodynamics in Gravitation, Astrophysics and Cosmology
Editor: Herman J. Mosquera Cuesta
Published by Nova Science Publishers, Inc., New york (2010)

3) Invited Referee of : The Open Astronomy and Astrophysics Journal

IRAP Ph. D. Students

Lecian Orchidea Maria

Position: Phd: until January 2009

Postdoc: February 2009 till present

I Scientific Work

Research (General Relativity)

II Conferences and educational activities

Conferences and Other External Scientific Work

The directions of Modern Cosmology (Barcelona, March 2009)

The XII Marcel Grossmann Meeting (Paris, July 2009)

Pizzi Marco

Position: Guest

Period covered: 12 July – 18 July 2009

I Scientific Work

I published on *arXiv:0904.4572* a paper about the Hawking effect. I presented this work in Paris at MGM XII; this is the abstract:
The Hawking radiation in the semi-classical approach is re-considered. In the so-called "Angheben method" for the calculation of the imaginary part of the action it was missed the temporal part contribution. This has been recently noticed by Akhmedov et al., but also there the time part was not properly considered, the sign being reversed. We show that using the semi-classical approach on a fixed background it is not possible to and any tunnelling effect from the interior to the exterior of the Schwarzschild black hole. The same critic applies to the derivations which use the Painlevé coordinates: also in this procedure it was missed the temporal factor contribution. In this way it is naturally solved also the "factor-two-problem".

II Conferences and educational activities

Marcel Grossmann Meeting XII, Paris; talk delivered in the parallel section: Quantum fields on curved spacetime.

Minazzoli Olivier

Position: IRAP PhD/Nice Sophia-Antipolis University PhD

Period: 2006-2009

Speaker and Posters

-MG12-Paris2009 : speaker (http://www.icra.it/MG/mg12/talks/anm1_minazzoli.pdf)

-Gphys Colloquium 2009 : speaker (http://gphys.obspm.fr/LesHouches2009/Program.html)

Publications in Proceedings of Meetings and Workshops

- Relativistic analysis of an earth-satellite time transfer , ILRS2007 (http://arxiv.org/abs/0709.4604)

Meetings, Courses and Workshops

-SIGRAV graduate school (Como 2009)

-Marcell Grossman Meeting (Paris 2009) (http://www.icra.it/MG/mg12/talks/anm1_minazzoli.pdf)

-Gphys Colloquium on Gravitation and Fundamental Physics in Space (Les Houches 2009) (http://gphys.obspm.fr/LesHouches2009/Program.html)

2009 List of Publications

-Post-Newtonian metric of general relativity including all the c^{-4} terms in the continuity of the IAU2000 resolutions , 2009PhRvD..79h4027M

-Relativistictime-transfer in the T2L2 experiment including the J_2 contribution to the Earth potential, O. Minazzoli, B. Chauvineau, E. Samain and P. Exertier, in preparation

Patricelli Barbara

Position: Ph.D. student

Period covered: October 2006 – October 2009

I Scientific Work

- Neutron Stars

I've collaborated to the development of a theoretical model describing nuclear matter in bulk: I've considered systems composed by a plasma of degenerate electrons, protons and neutrons, with values of mass number A ranging from the ones typical of nuclei to the ones typical of NSs (from few units up to 10^{57}). I have developed a numerical code for the integration of all the equilibrium equations, taking into account gravitational, weak and electromagnetic interactions and I have obtained a very significant result: a universal charge to mass ratio.

I have investigated the possibility of having electric fields of the order of the critical field of Sauter-Heisenberg-Euler-Schwinger for electron-positron pair production in massive nuclear cores; I've also analysed how the shape and the intensity of this electric field changes by assuming different density profile for protons. Now I'm extending the model to systems composed by non degenerate fermions.

I've studied the Crust of Neutron Stars; in particular, by using a general relativistic treatment I calculated the mass and the thickness of this physical region for different sets of initial conditions. I also investigated a possible correlation between the properties of the Crust and the baryonic material left by Gamma Ray Bursts (GRBs) progenitors during their collapse, within the framework of the Fireshell Model.

- Gamma Ray Bursts

I'm analysing GRB 080319B: I'm studying the light curve and the spectrum of this burst and trying to interpret them within the Fireshell Model. From the analysis of the prompt emission of this source, characterized by a very high emitted isotropic energy (~10^{54} ergs) and by an anomalously bright optical emission, it results that the assumption of thermal spectrum of photons in the comoving frame, which is a characteristic of the Fireshell Model, can be just an approximation in such extreme conditions. In particular, thanks to the high energetics of this burst, it was possible to analyse also spectra more resolved in time and this revealed small discrepancies between the theoretical predicted spectrum and the observed one. Therefore, I've investigated the possibility of having a different spectral energy distributions of photons in the comoving frame. As a first analysis I have introduced a ``modified" thermal spectrum, whose low energy slope depends on an index α. In particular, I have obtained all the equations involved in the problem by considering this new spectral energy distribution and I've implemented them in the numerical code

simulating the emission observed from GRBs. The best fit of the observational data (spectrum and light curve) was obtained by assuming a ``modified'' thermal spectrum with α=-1.8. The same result was obtained also for another very energetic burst: GRB 050904, characterized by z=6.29.

II Conferences and educational activities

Conferences and Other External Scientific Work

- The Sun, the Stars, the Universe and General Relativity, Fortaleza (Brazil), May 26 - 29, 2009
- Sixth Italian-Sino Workshop on Relativistic Astrophysics, Pescara (Italy), June 29 - July 1
- Twelfth Marcel Grossmann Meeting, Paris (France), July 12 - 18, 2009
- The Shocking Universe: Gamma Ray Bursts and High Energy shock phenomena, San Servolo Island - Venezia (Italy), September 14 - 18, 2009
- First Galileo - Xu Guangqi meeting, Shangai (China), October 26-30, 2009

Rangel Lemos Luis Juracy

Position: PhD student of IRAP

Period covered: 01-10/2009

I Scientific Work

Threshold energies of pions from pp interactions, Rangel Lemos, L. J., Kelner, S. R., III Stueckelberg Workshop on Relativistic Field Theories. In preparing. It will be published by Cambridge Scientific Publishers Ltd.

II Conferences and educational activities

Conferences and Other External Scientific Work

6th Italian-Sino Workshop in Relativistic Astrophysics, 2009, June 29 - July 1, Pescara, Italy. In this conference I presented the talk ``The relevance of pp interactions in GRB scenario'', which will be published by proceedings series.

XII Marcel Grossmann Meeting, 2009, July 12-18, Paris, France.

The Shocking Universe - Gamma Ray Burst and High Energy Shock, 2009, September 14-18, San Servolo, Venice, Italy.

III Service activities

Within ICRANet

I studied the statistical approach of Maarten Schmidt in the GRB data of the BATSE detector and others detectos. I developed this work with the Prof. Herman Mosquera Cuesta.

Outside ICRANet

University of Roma “La Sapienza”

During this year I studied the production of gamma rays in hadronic interactions. During the time spend at the University of Rome I collaborated with Prof. Paolo Lipari on the interpretation of the high energy gamma ray emission from Gamma Ray Bursts (GRB) arising from hadronic interactions of GRB protons with the Circum Burst Medium (CBM). This work was presented at the $6th$ Italian-Sino Workshop in Relativistic Astrophysics, held in Pescara.

Rueda Hernández Jorge Armando

Position: PhD Student-University of Rome “La Sapienza”

Period covered: 2006-2009

I Scientific Work

- Neutron star physics: the electrodynamical properties of neutron stars are studied by formulating self-consistently the equations of equilibrium governing neutron star interiors along with the correct formulation of the boundary conditions of the configuration, all duly expressed in general relativity.

- Nuclear physics: we study the properties of nuclear matter under extreme conditions of compression through the solution of the relativistic Thomas-Fermi equations of equilibrium. In particular, we analyze the charge to mass ratio relation of beta-equilibrated compressed nuclear matter. We address also the application of our approach to the equations of equilibrium of neutron stars as well as to the equilibrium equations governing quark stars.

- Critical fields in massive nuclear density cores: exploiting the scaling laws of the ultra-relativistic Thomas-Fermi equation we extrapolate the treatment of compressed nuclear matter to what we have called massive nuclear density cores. These massive cores are objects at nuclear density with a number of baryons of the order of 10^{57} and are composed by electrons, protons, and neutrons in beta equilibrium and are globally neutral. One of the most exciting properties of these cores is that, on their surface, strong electric fields of the order of the critical field for vacuum polarization of Sauter-Heisenberg-Euler-Schwinger are developed.

- Vacuum polarization processes: the effect of overcritical fields on the geometric and energetic properties of Reissner-Nordstrom and Kerr-Newmann black holes is studied.

II Conferences and educational activities

Conferences and Other External Scientific Work

- 11th Italian-Korean Symposium on Relativistic Astrophysics, Seoul (Korea), November 2-4, 2009

- 1st Galileo-Xu Guangqi Meeting, Shanghai (China), October 26-30, 2009

- 12th Marcel Grossmann Meeting On General Relativity, Paris (France), July 12-18, 2009

- 6th Italian-Sino Workshop on Relativistic Astrophysics, Pescara (Italy), June 29-July 1, 2009

- 1st Sobral Meeting, Fortaleza (Brazil), May 26-29, 2009
- 3rd Stueckelberg Workshop on Relativistic Field Theories, Pescara (Italy), July 8 - 18, 2008
- April Meeting of the American Physical Society, St. Louis (Missouri - USA), April 12-15, 2008
- 4th Italian-Sino Workshop on Relativistic Astrophysics, Pescara (Italy), July 20 - 30, 2007
- 10th Italian-Korean Symposium on Relativistic Astrophysics, Pescara (Italy), June 25 - 30, 2007
- 1st Cesare Lattes Meeting on Gamma Ray Bursts, Black Holes and Supernovae, Mangaratiba (Brazil), February 25 - March 3, 2007

2009 List of Publications

The role of the gravitational, electromagnetic, weak, and strong interactions in neutron star interiors within a non--linear sigma model, Hagen Kleinert, Jorge A. Rueda, Remo Ruffini, and She-Sheng Xue. In preparation.

The effect of critical fields on the properties of electromagnetic black holes in the Euler--Heisenberg approach, Jorge A. Rueda, Remo Ruffini, and She-Sheng Xue. In preparation.

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

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

On the relativistic treatment of compressed atoms and compressed massive nuclear density cores, Michael Rotondo, Jorge A. Rueda, Remo Ruffini, and She-Sheng Xue. Submitted to Phys. Rev D.

e^---e^+ pair creation by vacuum polarization around electromagnetic black holes, C.Cherubini, A. Geralico, J. A. Rueda H. and R. Ruffini, Phys. Rev. D 79, 124002 (2009).

Izzo Luca

Position: IRAP PhD student

Period covered: 2007-2010

I Scientific Work

Cosmography by GRBs, A&A 2008, 490 31, in collaboration with S. Capozziello

Constraining the cosmological Equation of State by Gamma Ray Bursts, accepted by A&A, in collaboration with M. Capaccioli, S.Capozziello and G. Covone

Cosmography by GRBs : Gamma Ray Bursts aspossible distance indicators, Nuc. Phys. B (Proc. Suppl.), 2009, 194, 206, in collaboration with S. Capozziello

II Conferences and educational activities

Conferences and Other External Scientific Work

- Observational Evidence for Black Holes in the Universe, February 10-15 (2008) and the satellite meeting Black Holes, Neutron Stars and Gamma Ray Bursts, February 16-17, S. N. Bose Centre for Basic Sciences, Kolkata, India.

- 3th Stueckelberg Workshop, July 8-18 (2008), Pescara, Italy.

- 13th Brazilian school of Cosmology and Gravitation, July 20-August 2 (2008), Mangaratiba, Brazil.

- Probing Stellar Populations out to the Distant Universe, September 14-19 (2008), Cefalù, Italy.

- 18th SIGRAV Conference, September 22-25 (2008), Cosenza, Italy.

- SIGRAV-INFN Cosmology School: “Coarse–Grained Cosmology”, January 26-29 (2009), Firenze, Italy

- Sobral meeting, May 26-29 (2009), Fortaleza (Cearà), Brazil

- Meeting Unita-sez. Napoli, June 2009, Napoli, Italy

- XII Marcel Grossmann meeting, July 13-18 (2009), Paris, France

- The Shocking Universe, September 14-18 (2009), Venezia, Italy

- 1st Galileo-Xu Guangxi meeting, October 26-30 (2009), Shanghai, Cina

- XI Italian-Korean meeting, November 2-4 (2009), Seoul, South Korea

Lectures

- Osservatorio Astronomico di Capodimonte, March 20, 2009, Napoli, Italy.

Contributed and Invited Talks

- 3th Stueckelberg Workshop, July 8-18 (2008), Pescara, Italy. In this workshop he presented the following talks: "GRB061007: A progress report", and "Detection of Cosmological Stochastic Background of Gravitational waves in f(R) gravity with FASTICA", which will be published in the proceedings of the meeting itself.

- 18th SIGRAV Conference, September 22-25, Cosenza, Italy. In this workshop he presented the talk "Cosmography by Gamma Ray Bursts: GRB as distance indicators?", which will be published in the proceedings series of the meeting itself.

- SIGRAV-INFN Cosmology School: "Coarse–Grained Cosmology", January 26-29 (2009). In this workshop he presented the talk "Cosmography by Gamma Ray Bursts: GRB as distance indicators?", published by Nuc. Phys. B (Proc. Suppl.).

- Lecture hed at Osservatorio Astronomico di Capodimonte, March 20, 2009, Napoli, Italy. In this lecture he presented the talk "Cosmography by Gamma Ray Bursts: GRB as distance indicators?".

- Sobral meeting, May 26-29 (2009). In this workshop he presented the talk "GRB 090423 : the most distant GRB ever known", which will be published in the proceedings series of the meeting itself.

- Meeting Unita-sez. Napoli, Napoli, Italy. In this workshop he presented the talk "Cosmography by Gamma Ray Bursts: GRB as distance indicators?", which will be published in the proceedings series of the meeting itself.

- XII Marcel Grossmann meeting, July 13-18 (2009). In this workshop he presented the talk "GRB 090423 : a canonical GRB at redshift 8.1", which will be published in the proceedings series of the meeting itself.

- 1st Galileo-Xu Guangxi meeting, October 26-30 (2009). In this workshop he presented the talk "GRB 080916C in the fireshell scenario", which will be published in the proceedings series of the meeting itself.

- XI Italian-Korean meeting, November 2-4 (2009). In this workshop he presented the talk "GRB 090423 in the fireshell scenario", which will be published in the proceedings series of the meeting itself.

Pugliese Daniela

Position: Ph.D. Student IRAP PhD Sixth Cycle

Period covered: 2007-2010

I Scientific Work

September 2008—October 2009

I studied test particle motion in Reissner-Nordstrom spacetime. In particular stable circular orbits of neutral and charged test particles were analyzed and the effective potential for these cases was studied. A comparison between the black hole and naked singularity cases has been performed. In particular the physic of naked singularities and the role of the classical electron radius has been

investigated. Analytical and numerical analysis for fixed values of the charge-mass ratio of the test particle and the Reissner-Nordstrom spacetime were given. I studied self gravitating systems in the cotext of multidimensional theories. In particular in the scenario of Kaluza Klein theories. Effective potential for a class of static solutions of Kaluza-Klein equations with three-dimensional spherical symmetry has been studied. Test particles motion is analyzed. In attempts to read the obtained results with the experimental data, particular attention is devoted to the Schwarzschild's limit

of the four--dimensional counterpart of these (free-electromagnetic) solutions. Massive particles stable circular orbits in particular are studied, and a comparison between the well--known results if the Schwarzschild's case and ones found for the static higher-dimensional case is performed. Radiation emitted by a falling test particle is analyzed. Deformation of lines of forces of charged test particles has been analyzed. A modification of the circular stable orbits is investigated in agreement with the experimental constraints.

December 2007—September 2008

My actual research activity is related to the study of the self-gravitating systems of elementary particles. In particular I considered static, spherically symmetric self-gravitating (cold) systems of scalars minimally coupled to a U(1) gauge field (charged boson stars). They are localized solutions of the coupled system of Einstein and general relativistic Klein-Gordon equations of a complex scalar field with a local U(1) symmetry. The study of boson stars were first introduced by Ruffini and Bonazzola in 1969. They used field quantization of a real scalar field and, considering the ground state of N particles, they found for spherical symmetric equilibrium, the solutions of the Einstein-Klein- Gordon equations. A method of self-constituent field was used to study the equilibrium configurations of a system of self-gravitating scalar bosons and fermions in their ground state without considering the traditional perfect fluid approximations or equations of state. The general relativistic treatment eliminates completely some difficulties present in the non relativistic Newtonian approximation, where it was noted that at an increase of number of particles

correspond an increase of the total energy of the system until the energy reaches a maximum value and then decreases to negative values. Furthermore from this analysis it was also evident that one cannot treat such a system of many bosons (with a constant temperature) as perfect fluid since the pressure of the system is anisotropic. On the other hand this treatment introduced for the fist time the concept of a critical mass for these objects. In fact as for other compact objects as white dwarfs and neutron stars, there is a critical mass and a critical number of particle , below which this system is stable against complete gravitational collapse to a black hole. In my study particular attention is given to the analysis of the stability and equilibrium of this systems in particular for values boson charge near the critical values and for different values of the mass-charge ratio of these systems.

In general, attention is due to the problem of stability of matter, bosons or fermions, confined by its self-generated gravity. Gravitational attraction for spherically symmetric self gravitating systems of scalars(charged as neutral) counter{balances the repulsion due to kinetic energy. On the other hand, Heisenberg uncertainty principle prevent neutral boson stars from a complete gravitational collapse, meanwhile the radius R should satisfy the condition $R>3R_S$ where R_S is Schwarzschild radius, to avoid complete gravitational collapse. Stable charged boson stars can exist if the gravitational attraction is larger than the Coulomb repulsion: if the repulsive Coulomb force is bigger than the attractive gravitational one the system should be instable. Moreover as for other charged objects, if the radius of these systems is less than the electron Compton wavelength and if is super critically charged then pair production of electrons and positrons occurs.

A great interest is involved in this study of the phenomena related to the formations and stability of self-gravitating systems. Compact objects play an important role in the astrophysical researchand also they involve a great amount of physic of nuclei and of elementary particles. Moreover some authors conjectured that a boson stars could model a self-gravitating Bose-Einstein condensate on an astrophysical scale. These systems provide also an ideal model to investigate the behaviour of elementary particles in the context of general relativity, involving the study of field equations on a semi-riemannian manifold and in particular for the charged boson stars the Einstein-Maxwell equations. On the other hand if no fundamental elementary scalar particle has been detected so that the existence of the spin 0-particles is still an open issue, nevertheless in the theory of Glashow-Weinberg-Salam, a real scalar particle, the Higgs particle after symmetry breaking is introduced. Moreover the study of gravitational equilibrium solutions of scalar fields is motivated also by the idea that the collapse of charged compact objects of bosons in principle could to lead charged black holes. In this way these configurations may represent also an initial condition for the process of gravitational collapse and in many respects of the physic of black hole as for example in the explanation and modelling of gamma ray emission (GRBs)that postulates the existence of critical and overcritical (electrical) fields in black holes in order to extract their blackholic energy. After the numerical resolutions of the Einstein-Klein-Gordon-Maxwell equations for different values of the radial function at the origin and for different values of the charge, I focused attention on the stability of these configurations for boson charge near or greater the critical valued. In particular, from the numerical integrations it is evident that stable charged configurations of self{gravitating charged bosons are possible even with particle charge $q = q_{crit}$. It is also evident for different values of $q > q_{crit}$ stable solutions without nodes are possible only for little value of central density; meanwhile for value $q > q_{crit}$ and higher central densities the boundary conditions at the origin are not more satisfied, only stable configurations for solutions with one or more nodes are possible. The

behaviour of the radius such as the total charge and mass of the system near the critical point is studied. In this line the future analysis is also devoted to the study of a generic quantized system of boson and anti-bosons such as charged self-gravitating fermions.

II Conferences and educational activities

July—August 2009

-2nd Italian-Pakistani Workshop on Relativistic Astrophysics July 8-10, 2009 - Pescara, Italy

12th Marcel Grossman Meeting MG12_Paris July 12-18, 2009

GIVEN TALKS AND SEMINARS

July—August 2009

“ Massive test particles motion in Kaluza-Klein gravity”

2nd Italian-Pakistani Workshop on Relativistic Astrophysics July 8-10, 2009 - Pescara, Italy

“Effective potential approach to the motion ofmassive test particles in Kaluza-Klein gravity”

12th Marcel Grossman Meeting MG12_Paris July 12-18, 2009

“ Test particles motions in Reissne-NordstrÖm spacetime”

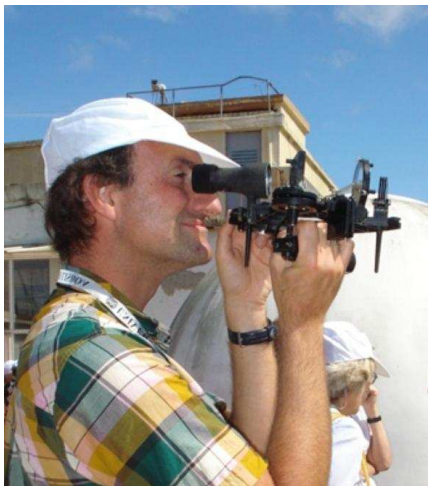
12th Marcel Grossman Meeting MG12_Paris July 12-18, 2009

PUBLICATIONS

“Deformation of space—time metrics”

Proceeding of the *Third Stuckelberg Workshop, July 8-18 (2008) , Pescara, Italy. In press.*

Sigismondi Costantino



Position in ICRANet: PhD Student

Period covered: 2009

I Scientific Work

Coordination of international measurements (IOTA) of the Solar Diameter through solar eclipses and hourly circle transits (IRSOL). Data analysis: method's definition and use.

Publications:

1. C. Sigismondi, Guidelines for Measuring Solar Radius with Baily Beads Analysis, Science in China **G 52**, 1773, (2009):
2. C. Sigismondi, A. Kilcik, J-P. Rozelot, K. Guhl, Solar Radius Determination from Solar Eclipse Observations of March 29, 2006, Solar Physics **257**, 237 (2009).
3. C. Sigismondi, et al., Baily Beads Atlas in 2005-2008 Eclipses, Solar Physics **258**, 191 (2009).

II Conferences and educational activities

1) Sejong University-Italian Embassy, Seoul, Invited talk 11.6.2009
2) Visit to Helsinki Observatory 13-15.6.2009
3) Italia-China Meeting, Pescara 30.6-4.7 2009
4) Italia-Pakistan Meeting Pescara 8.7-11.7 2009
5) XXVIII ESOP European Meeting on Occultation Programs, Niepolomice Poland 29.8-4.9.2009, invited talk-chair of workshop on solar diameter
6) XLII UAI Meeting, Padova 24-27.9.2009
7) XVII GAD congress on Digital Astronomy and Second National Meeting on Extrasolar Planets, Vicenza October 18, 2009 (invited talk)
8) IAGA2 Meeting on Solar Physics, Cairo-Egypt, Invited talk, 4-9.12.2009

Visit to IRSOL, Istituto Ricerche Solari Locarno (CH) from July 16 to 25, 2009 for research on solar diameter measurements with hourly circle transits.

University Courses

"La Terra nel Sistema Solare" (4 credits). "Sapienza" University of Rome Geography Department

"Filosofia dell'Astronomia" (2 credits). Pontifical University Regina Apostolorum, Rome

"Storia dell'Astronomia" (2 credits). Pontifical University Regina Apostolorum, Rome

Laboratory of Astrophysics, team of Prof. Paolo de Bernardis (Sapienza University) with under graduate students: M. Tringali, E. di Valentino, A. Raponi, F. Oliva, D. Caprioli e S. Matteucci. Periodo Gennaio-Settembre 2009.

International Year of Astronomy 2009 Several conferences and events organized, list retrievable at www.astronomy2009.it with Sigismondi keyword

2009 list of Publications

C. Sigismondi, Guidelines for Measuring Solar Radius with Baily Beads Analysis, Science in China G 52, 1773, (2009):

C. Sigismondi, A. Kilcik, J-P. Rozelot, K. Guhl, Solar Radius Determination from Solar Eclipse Observations of March 29, 2006, Solar Physics 257, 237 (2009).

C. Sigismondi, et al., Baily Beads Atlas in 2005-2008 Eclipses, Solar Physics 258, 191 (2009).

Proceedings del 3rd Stueckelberg Meeting, Pescara 8 - 18 Luglio 2008, Cambridge Scientific Publisher, Sigismondi, C.; G. Dangl and R. Nugent, Measuring solar disk shape up to relativistic accuracy: the role of scintillation in ancient naked eye data

Science in China G 52(10) 1-5, Sigismondi, C. Guidelines for measurng solar radius with Baily beads analysis

Journal of Korean Physical Society 55(4), Sigismondi,C. Relativistic corrections to lunar occultations

Accepted for publication

Astronomia UAI, Proc. 42 °congresso nazionale, C. Sigismondi, Misura del diametro del Sole ad almucantarat zero

Astronomia UAI, Proc. 42 °congresso nazionale, C. Sigismondi, Incontri Celesti, vita del padre Clavio in 5 atti

Astronomia UAI, Proc. 42 °congresso nazionale, C. Sigismondi, Impatti lunari, frequenza e monitoraggio

2009 submitted

Astronomia UAI, C. Sigismondi, L'epistolario di Gerberto, il papa astronomo

Astronomia UAI, C. Sigismondi, Misure quantitative del seeing atmosferico

Belvedere Riccardo

Position: Ph.D. student

Period covered:2008/2010

I Scientific Work

-"*Semiclassical suppression of weak anisotropies of a generic Universe*": Europhys.Lett.86:69001,2009

-"*Semi-classical isotropization of the Mixmaster Universe*": to appear in the Proceedings of the 3rd Stueckelberg Workshop, July 2008, Pescara - Italy.

My scientific work deals with probabilistic approach to quantum cosmology, instabilities of self-gravitating systems, classical cosmology and plasma physics.

II Conferences and educational activities

Conferences and Other External Scientific Work

-Febbraio 2006 **1st Bego rencontre**, (main lectures by Prof. T.Damour) Nizza, 6-16 Febbraio.

-Luglio 2006 **11th Marcel Grossmann Meeting on General Relativity**, Berlino, 23-29 Luglio.

-Settembre 2007 **2nd Stuckelberg Workshop**, (main lectures by Prof. T.Thiemann)Pescara, 3-8 Settembre.

-Luglio 2008 **3rd Stuckelberg Workshop**, (main lectures by Prof. G. 't Hooft) Pescara, 8-18 Luglio.

-Luglio 2009 **12th Marcel Grossmann Meeting on General Relativity**, Parigi, 12-18 Luglio.

-Giugno/Luglio 2009 **6th Italian-Sino Workshop in Relativistic Astrophysics**, Pescara , 29 Giugno – 1 Luglio.

-Settembre 2009 **The Shocking Universe Meeting**, S.Servolo-Venezia, 14-18 Settembre.

Given talks and seminars:

-Luglio 2008 — 3rd Stuckelberg Workshop, Pescara, 8-18 Luglio.

Title of talk:

Quantum Isotropization Mechanism for the Mixmaster Model

-Luglio 2009 — 12th Marcel Grossmann Meeting on General Relativity, Berlino, 23-29 Luglio.

Title of talk:

Quantum Suppression of Weak Universe Anisotropy

Ceccobello Chiara

Position: PhD student

Period covered: January 2009 – December 2011

I Scientific Work

During the first year of my PhD studies (2009) I carried out the project started during my thesis and aimed to the theoretical and observative study of neutron stars with ultra-strong magnetic fields (magnetars). I'm developing a numerical code for the solution of radiative transfer problem for polarized photons in a magnetized plasma. This code represents the extension and the completion of that developed during the thesis. The main goal will be the implementation into the software for the spectral analysis XSPEC with the possibility to be used by the all scientific community.

II Conferences and educational activities

Educational activities:

1."Methodology of pattern recognition and imaging"

2. "Cosmologia e astrofisica nelle microonde e bande vicine" (C.Burigana), Corso per Dottorandi in Fisica, Dipartimento di Fisica Blocco C

3."Osservazioni ottiche di supernovae e gamma ray bursts" (M.Della Valle), Corso per Dottorandi in Fisica, Dipartimento di Fisica Blocco C

4."Spectral and timing properties of compact objects (Black hole and neutron stars: observations vs. theory)" (L.Titarchuk) , Corso per Dottorandi in Fisica, Dipartimento di Fisica Blocco C

5. "Prospects in high energy astrophysics"(Shuan Nan Zhang), Corso per Dottorandi in Fisica, Dipartimento di Fisica Blocco C

6."Applicazioni della teoria dei campi", LS in Fisica, indirizzo teorico generale, L.Caneschi

7."Simulazione Computazionale", LS in Informatica, A.Drago

Conferences:

1. "Observational evidence of existence of a Black Hole (BH): BH mass and BH spectral signature"	L.Titarchuk (U.Ferrara,US Naval Research Lab. And Goddard Space Flight Center)

2. “Conformal Dynamics for Electroweak Symmetry Breaking and Cosmology”	F.Sannino (University of Southern Denmark)
3.”X-ray polarimetry in astrophysics:open issues and prospects”	E.Costa (INAF, Roma)
4.”Searching the Higgs boson and measuring its properties at the LHC: a theoretical perspective”	M.Moretti (Università di Fisica, Ferrara e INFN)
5.”The baryon asymmetry of the Universe”	S.Lavignac (IphT, CEA Saclay, France)

My activities:

1. Progetto Lauree Scientifiche (8 ore)

2. Tutorato “Laboratorio di Dinamica”, G.Ciullo (30 ore)

3."Study of the accreting pulsar 4U 0115+63 using a bulk and thermal Comptonization model"	Aula 300, Blocco C,18/03/2009,17:00
(Journal Club)	
4. “Comptonization in ultra-strong magnetic fields. Numerical solution of the radiative transfer equation and application to the neutron star case”	CNOC 2009, S.Margherita in Pula (CA)

Workshop:

1.Workshop ASI: Studi di osservazione dell'Universo	Roma,25-26 Marzo 2009
2. “The coming age of polarimetry”	Roma, 27-30 Aprile 2009
3.”Black holes in binary systems:Observations vs. Theory”	Ferrara, 11-12 Settembre 2009
4.”CNOC 2009”	S.Margherita in Pula (CA), 22-25 Settembre 2009

Ferrari Francesca

Position: PhD student

Period covered: January 2009 - present

I Scientific Work

Laue Lenses development in Larix A facility - Univeristy of Ferrara

II Conferences and educational activities

Conferences and Other External Scientific Work

Talk at SPIE Optics and Photonics Convention, San Diego, 2-6 Aug 2009

Work With Students

Talks in the Project Lauree Scientifiche

2009 List of Publications

Radio halos in nearby (z < 0.4) clusters of galaxies
Authors: Giovannini, G.; Bonafede, A.; Feretti, L.; Govoni, F.; Murgia, M.; Ferrari, F.; Monti, G.
Publication: eprint arXiv:0909.0911
Publication Date: 09/2009
Comment: Accepted for the publication in Astronomy and Astrophysics. A version with full resolution figures is available at http://www.ira.inaf.it/~ggiovann/
Bibliographic Code:2009arXiv0909.0911G

New results on focusing of gamma-rays with Laue lenses
Authors: F. Ferrari, F. Frontera (PI), G. Loffredo, F. Nobili, E. Virgilli, C. Guidorzi, V. Carassiti, F.Evangelisti, L. Landi, S. Chiozzi, S. Squerzanti, E. Caroli, J.B. Stephen, F. Schiavone, A. Basili, K.H. Andersen, P. Courtois
PAPER NO. 7437-19
TRACKING NO. OP09O-OP402-68
SPIE Optics and Photonics

Han Wenbiao

Position: Ph.D student

Period covered: 2009-2011

I Scientific Work

Pair oscillation in Sauter type electric fields

II Conferences and educational activities

Conferences and Other External Scientific Work

1. The sixth Italian-Sino meeting, talk: Pair oscillation in spatially inhomogeneous electric fields

2. The 12th Marcel Grossmann meeting

3. The first Galileo-Xue Guangqi meeting

2009 List of Publications

The gravitational waves from test particles around black holes immersed in a strong magnetic field, Wen-biao Han, 48, 621 (2009), *International Journal of Theoretical Physics*

Pandolfi Stefania

Position: 2nd year PhD Student

Period covered: 1 Nov 2009- 31 Oct 2010

I Scientific Work

'When Did Cosmic Acceleration Start ?' Nuclear Physics B (Proc. Suppl.) 194 (2009) 294–299

'No Evidence for Dark Energy Dynamics from a Global Analysis of Cosmological Data' submitted to Physical Review D, arXiv:0908.3186v1 [astro-ph.CO]

'Constraining the energy density: a Bayesian approach': in preparation

'New bounds on Cosmic Reionization from CMB experiments': in preparation

II Conferences and educational activities

- SIGRAV School in Cosmology and INFN Formation School, 26-01-2009 to 29-01-2009, Galileo Galilei Institute for Theoretical Physics, Florence, Italy
- Dark Matter Conference, 09-02-2009 to 11-02-2009, Galileo Galilei Institute for Theoretical Physics, Florence, Italy
- Dark Energy Conference 02-03-2009 to 04-03-2009, Galileo Galilei Institute for Theoretical Physics, Florence, Italy
- Summer collaboriation of 3 months with Prof. Asantha Cooray, at UCI, University of California Irvine. The results of this work will be published in the paper 'New bounds on Cosmic Reionization from CMB experiments', in preparation.

Work With Postdocs:

with Dr. Massimiliano Lattanzi, 'Constraining the energy density: a Bayesian approach', in preparation.

Siutsou Ivan

Position: IRAP PhD student

Period covered: nov. 2008 – oct. 2009

I Scientific Work

Kinetic instabilities in collisionless and shockless ultra-relativistic streaming cold electron-proton plasma / V. M. Chechetkin, V. F. Dyachenko, S. L. Ginzburg, N. N. Fimin, R. Ruffni, G. V. Vereshchagin, and I. A. Siutsou

Nonmetric origin of the Pioneer anomaly / I. A. Siutsou, L. M. Tomilchik // Submitted to GRG

II Conferences and educational activities

Conferences and Other External Scientific Work

“Plasma dynamics in collisionless and shockless ultra-relativistic shell” / Zeldovich Meeting, April 20-23, 2009 Minsk – BELARUS

Kinetics and electrodynamics of collisionless plasma in GRBs / 6th Italian-Sino Workshop, June 29-July 1, 2009 - Pescara, Italy

Gravitational origin of the Pioneer Anomaly in metric theories of gravitation: can it be done without destruction of coherence between the theory and experiment in gravitational physics? + Kinetics and electrodynamics of collisionless plasma in GRBs / XII Marcel Grossmann Meeting, July 12-18, 2009 Paris

Taj Safia

Position: visiting student

Period covered: from 4 June, 2009 to 20 November, 2009.

I Scientific Work

1. H. Quevedo and S. Taj, Geometrothermodynamics of higher dimensional black holes in Einstein-Gauss-Bonnet theory, (2009), in preparation.

2. H. Quevedo and S. Taj, Thermodynamics of black holes in the Horava-Lifshitz gravity model, (2009), in preparation.

II Conferences and educational activities

1. Marcel Grossman meeting in July 2009, Paris

Administrative Staff

Adamo Cristina

Address	Via Berardinucci, 95 I-65123 Pescara (Italia)
Mobile	+39 347 1415780
Phone	+39 085 77816
E-mail	chris87_2003@yahoo.it
Cityzenship	Italian
Birth date	12 December 1972
Sex	Female

Work experiences

Date	04 March 2007 → 09.10.2009
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 - Viale S. Tinozzi, s.n. - 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	
Dates	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 Sujects	Purchase and logistics, financing, administration and control, marketing, production, budget, bronging 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**

Other language(s)	Understanding				Speaking				W r i t i n g	
Self-assessment	Listening		Reading		Spoken interaction		Listening			
European level (*)										
English	B1	Independent user	B2	Independent user	C1	Proficient user	B2	Independent user	B2	Independent user
French	A1	Basic User	A1	Basic User	A1	Basic User	A1	Basic User	A1	Basic User

Personal skills and competences

Mother tongue

(*) Common European Framework of Reference (CEF) level

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.

CURRICULUM VITAE

PERSONAL INFORMATION

Surname and name: Veronica D'Angelo
Place and date of birth: Ortona (CH), 21/07/1974
Nationality: Italian
Address: Pescara, c/o ICRANET
Phone: (+39) 085 / 23054200 Fax: 085 / 4219252
E-mail: veronica.dangelo@icranet.org

EDUCATION AND TRAINING

Qualification

- Qualification in "Public Facilitated Financing Expert to Firms", got after attending a regional course organized by the Association CNOS FAP, c/o the Partner NEXUS S.r.l., lasting 150 hours, from November 2004 until March 2005.
- Qualification in "Management Audit Technician", got attending a regional course organized by EUROBIC ABRUZZO E MOLISE S.c.r.l. in collaboration with a business consulting company, *De Marinis e Di Giambattista associati*, lasting 500 hours, concluded in October 2002, after one month **stage** at "Sporting Hotel Villa Maria" in Francavilla al Mare and "Villa Serena" in Città S'Angelo.
- Degree in Economics and Business**,** achieved on the 8th OF March, 2002, at Università degli Studi "G. D'Annunzio" di Pescara, upholding a theory entitled *Implicazioni strategiche dei meccanismi di finanziamento delle Aziende Ospedaliere.* Relator Prof.ssa A. Consorti, subject: Business Strategy. Mark: 110/110 *cum laude*
- Accountancy High School Degree got in 1993 at I.T.C. "Aterno" in Pescara.

WORK EXPERIENCE

- **From 03/01/2006 – present: accountancy - administrative employed** at ICRANet, where I started to work with a project contract, followed, after a first renewal, by an employment contract. Here, I am charged of:
  - Managing the relationships with suppliers,
  - Controlling entrance invoices,
  - Calculating reimbursement and rewards to our scientific visitors,
  - Preparing payment orders for the bank,
  - Executing and verifying on-line the payments,
  - Meeting our bank referents for particular payment operations,
  - Cash holding,
  - Book-keeping. I use a specific software created *ad hoc* for our Centre.
- **From 25/07/2005 al 30/12/05: stage in PERSONNEL RESEARCH AND SELECTION at Agency ADECCO in Pescara, Via G. D'Annunzio,** during winch I got the following competences:
  - Reception of applicants, personal interview, screening of curricula and data entry,
  - Managing relationships with customs in case of personnel requests; research and selection of the requested profiles,

- Knowledge of D.lgs 276/03.
- Explaining the forms to be filled-in by the chosen applicants at the moment of the employment,

- **<u>In the year 2005</u>: little experience as promoter for Wind, at IPER in Città S.Angelo, and as person charged of inventory at AUCHAN.**
- **<u>March 2003 – June 2004</u>: training at a Work Consulting** Company**, "**Team Consulting Snc", in Pescara, during which I l learned how to manage the administrative file related to the personnel engaged in companies/firms. Referents: Rag. Fuschini Mario.
- **<u>September 2002</u>: stage in Management Auditing** at "Sporting Hotel Villa Maria" in Francavilla al Mare e "Villa Serena" in Città S'Angelo, during which I analysed, in a strategic view and in terms of efficiency and effectiveness / efficacy, the processes *business administration* relevant to storehouse-pharmacy and stationery, with the purpose of getting and establishing a system of a Total Quality Management. Referent: Director of Sporting Hotel, Angelo Tirolesi.

Foreign Languages

- Good standard of written English; fairly good level of written and spoken English. At present, I am attending a course based on the *Sandwich Method* in order to improve my skills.
- Title of attendance of a first level course of French language (nov. 2003 – feb. 2004), at Centro Territoriale Permanente in Pescara, in collaboration with Italian MIUR.

Use of PC

At present: Windows'98 and 2000. Good knowledge of Word and faily good of Excel; navigation in Internet; good knowledge of ICRANet accountancy software.

AKNOWLEDGEMENTS

Scholarship awarded at the course in <u>"Management Audit Technician"</u>.

APTITUDES AND SKILLS

Good will, devotion to my job, adaptability; good skills in relationship, organization, integration and collaboration.

INTERESTS

Acqua–gym, swimming, painting rochs, Gustav Klimt paintings, participating to artistic and cultural events in my city, cinema, language courses.

I authorize to the treatment of my personal information, ex D.lgs 196/2003

Veronica D'Angelo

Pescara, 23.11.2007

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Del Beato Annapia

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+39 085 4219252
annapia.delbeato@icranet.org

Work experiences

Dates	02/2008 - present
Occupation or position held	Responsible for the Documentation Center of ICRANet
Main activities and responsibilities	library management collection and cataloguing of scientific publications journals submissions and books purchase website contents meeting planning press contacts
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 from 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 Institute 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" (university)
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) (university)
Address	Coventry (United Kingdom)
Dates	07/2005
Title of qualification awarded	Degree in Foreign Languages and Literature (courses on Touristic 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 /	Courses on English language

occupational skills covered	
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)
Artistic skills and competences	Singing and drawing
Driving licence(s)	B

Di Berardino Federica

NAME	**FEDERICA DI BERARDINO**
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E-MAIL	**federica.diberardino@icranet.org**
NATIONALITY	Italian
DATE AND PLACE OF BIRTH	31-03-1980 PESCARA

WORK EXPERIENCE

November 2005-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
- Congress Hostess (Marcinelle 2005) for Manoppello Municipality (PE);

October-December 2004
- Customer service assistant for Terravision S.r.l. at Aeroporto d'Abruzzo, Pescara;

January-December 2004
- English courses for elementary and high school italian students;
- Translations from/to English;

May 2004
- Work for Ajilon Agency, Pescara, for distribution of books in the local schools;

March 2004
- Interviews for Customer Satisfaction, for "NETWORK Istituto di ricerca S.r.l." at Iper - Città Sant'Angelo;

2001-2004
- Researcher for "Informazione e servizi senza barriere"(Agency: NETWORK S.r.l.).

2001-2003
- Exhibition Hostess for IN FIERA S.r.l., at "ECOTUR –Turismo in fiera" 2001, 2002, 2003, 2004 (at Palacongressi, Montesilvano – PE);

1998-2000
- Hostess and sales promoter for the agency "Image Service", Città Sant'Angelo (PE);
- 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., Torino).

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

- 4 months courses at "Nazareth College" di Rochester, N.Y. (U.S.A.)and final examson English, Marketing and Spanish.

1998

- High School degree at Liceo Linguistico "G. Marconi", Pescara.

Ottobre 1996

- 1 month English classes at "Irondequoit High-School" in Rochester (N.Y.)

1992, 1994, 1995

- Repeted visits to England to attend english colleges for training courses;
- Visits to the USA (N.Y. e Massachussetts) to improve oral American-English knowledge.

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 Bislamar.

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 attitute 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, wich 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. Professionality based on accuracy, punctuality and strong attitude to work towards goals.
TECHNICAL SKILLS	Computer competences: Windows; Softwares: 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	Great passion for music (jazz, acoustic, ethnic, rock and classic), dance, theatre, readings and paintings. Free time: travels, museums. Piano and guitar classes. Artistic Gym and Jazz Dance; I am still studying in a Jazz Dance School.
DRIVING LICENCE	Driving licence cat. B

Latorre Silvia

PERSONAL INFORMATION

Name	**SILVIA LATORRE**
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, using ICRANet cost-accounting system.

• Date	01/12/2006 – 20/01/2008
• Name of employer	DelVerde Industrie Alimentari S.p.A.
• Firm or Sector	Pasta Factory
• Kind of Employment	Trainee
• Main Tasks	Study and analysis of annual financial statements of ten competitor pasta factories for the financial years from 2002 to 2006, as well as reclassification of balance sheets and profit and loss accounts and calculation of the main income and financial indexes. Analysis of export strategies of DelVerde and other Italian pasta factories.

EDUCATION

• Date	11/2005 – 12/2007
• Institution	Università degli Studi “G. D’Annunzio” Pescara
• Main Subjects	Marketing, commercial law, innovation management and economics, business statistics, quality technique and theory
• Achieved Qualification	Degree in Economics and Administration of the enterprises. Final thesis in analysis of balance sheet: “*La leva finanziaria e la leva operative nel settore pastario*” (supervisor Prof. Michele A. Rea)
• Mark	110/110 *cum laude*

• Date	09/2001 – 11/2005
• Institution	Università degli Studi “G. D’Annunzio” Pescara
• Main Subjects	Financial Mathematics, bank technique, business economics, accountancy, microeconomics, macroeconomics, private and public law,

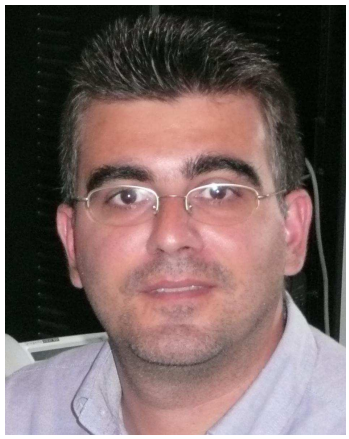
	work law, analysis of balance sheet, business strategy and politics
• Achieved Qualification	Business Economics Degree. Final thesis in business strategy and politics: *"Gli strumenti di analisi strategica: l'analisi SWOT"* (supervisor Prof. Michele A. Rea)
• Mark	106/110
• Date	09/1996 – 07/2001
• Institution	Secondary School focusing on sciences- Liceo Ginnasio Statale "Publio Virgilio Marone" Vico del Gargano (FG)
• Main Subjects	Mathematics analysis, Italian language and literature, Latin language and literature, Chemistry, Physics
• Achieved Qualification	Scientific school-leaving certificate
• Mark	100/100

FOREIGN LANGUAGES

MOTHER-TONGUE	**ITALIAN**
OTHER LANGUAGES	**ENGLISH** (GOOD) **– FRENCH** (ELEMENTARY)

RELATIONAL ABILITIES	Good relational abilities thanks to the past work experience at DelVerde and to the present experience at ICRANet. Self-reliant. Good listener.
ORGANIZING COMPETENCES	Good organizing abilities acquired handling the big amount of data at DelVerde and working at ICRANet, where they are essential for managing the large number of guests, mainly during the meetings.
TECHNICAL SKILLS	Computers competences: Windows. Softwares: Word, Excel, Power Point. Very good use of Internet and e-mail accounts. Good use of cost-accounting system HELPAZI and bank system BNL Businessway. Elementary knowledge of HTML e CSS programs for websites. Knowledge of "TOP VALUE" program for financial diagnosis and corporate planning.
ARTISTIC SKILLS	Piano classes attended for 8 years. sol-fa Diploma.
DRIVING LICENCE	Driving licence cat. B
FURTHER INFORMATIONS	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