Staff, Visiting Scientists
and Graduate Students
at the Pescara Center
December 2012
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## ICRANet Faculty Staff

<table>
<thead>
<tr>
<th>Name</th>
<th>Affiliation</th>
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<tbody>
<tr>
<td>Belinski Vladimir</td>
<td>ICRANet</td>
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<tr>
<td>Bianco Carlo Luciano</td>
<td>University of Rome “Sapienza” and ICRANet</td>
</tr>
<tr>
<td>Einasto Jaan</td>
<td>Tartu Observatory, Estonia</td>
</tr>
<tr>
<td>Novello Mario</td>
<td><em>Cesare Lattes-ICRANet Chair</em> CBPF, Rio de Janeiro, Brasil</td>
</tr>
<tr>
<td>Rueda Jorge A.</td>
<td>University of Rome “Sapienza” and ICRANet</td>
</tr>
<tr>
<td>Ruffini Remo</td>
<td>University of Rome “Sapienza” and ICRANet</td>
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<tr>
<td>Vereshchagin Gregory</td>
<td>ICRANet</td>
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<tr>
<td>Xue She-Sheng</td>
<td>ICRANet</td>
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</tbody>
</table>
Adjunct Professors Of The Faculty

Aharonian Felix Albert  
*Benjamin Jegischewitsch Markarian Chair*
Dublin Institute for Advanced Studies, Dublin, Ireland  
Max-Planck-Institut für Kernphysik, Heidelberg, Germany

Amati Lorenzo  
Istituto di Astrofisica Spaziale e Fisica Cosmica, Italy

Arnett David  
*Subramanyan Chandrasekhar-ICRANet Chair*
University of Arizona, Tucson, USA

Chakrabarti Sandip P.  
Centre for Space Physics, India

Chardonnet Pascal  
Université de la Savoie, France

Chechetkin Valeri  
*Mstislav Vsevolodich Keldysh-ICRANet Chair*
Keldysh Institute for Applied Mathematics, Moscow, Russia

Damour Thibault  
*Joseph-Louis Lagrange-ICRANet Chair*
IHES, Bures sur Yvette, France

Della Valle Massimo  
Osservatorio di Capodimonte, Italy

Everitt Francis  
*William Fairbank-ICRANet Chair*
Stanford University, USA

Frontera Filippo  
University of Ferrara, Italy

Jantzen Robert  
*Abraham Taub-ICRANet Chair*
Villanova University, USA

Khalatnikov Markovich Isaak  
*Lev Davidovich Landau-ICRANet Chair*
Landau Institute for Theoretical Physics, Russia

Kerr Roy  
*Yeovgeny Mikhailovich Lifshitz-ICRANet Chair*
University of Canterbury, New Zealand

Kleinert Hagen  
*Richard Feynmann-ICRANet Chair*
Freie Universität Berlin

Lee Hyung Won  
*Yong Duk Kim-ICRANet Chair*
School of Computer Aided Science, Inje, Korea

Madey John  
*William Fairbank-ICRANet Chair*
University of Hawaii

Misner Charles  
*John Archibald Wheeler-ICRANet Chair*
University of Maryland

Nicolai Hermann  
Albert Einstein Institute – Potsdam, Germany

Pelster Axel  
Institute for Advanced Study, Germany
Pian Elena INAF and Osservatorio Astronomico di Trieste

Piran Tsvi Yuval Neeman-ICRANet Chair
The Hebrew University - Jerusalem

Popov Vladimir ITEP, Russia

Punsly Brian Matthew Mathew California University, Los Angeles USA

Quevedo Hernando Institute of Nuclear Science, UNAM

Rafelski Johann University of Arizona, USA

Rosati Piero European Southern Observatory, Germany

Rosquist Kjell Karl Gustav Jacobi-ICRANet Chair
Stockholm University, Sweden

t Hooft Gerard (Nobel Laureate) Institut for Theoretical Physics
Utrecht Universiteit, Holland

Titarchuk Lev US Naval Laboratory, USA
Lecturers

Aksenov Alexey  Institute for Theoretical and Experimental Physics
Alekseev Georgy  Steklov Mathematical Institute-Russian Academy of Sciences
Bini Donato  CNR and ICRANet, Italy
Boccaletti Dino  ICRANet and Università di Roma "Sapienza"
Chen Pisin  National Taiwan University
Chieffi Alessandro  INAF, Rome, Italy
Couillet Pierre  Université de Nice - Sophia Antipolis, France
Di Castro Carlo  Università di Roma "Sapienza", Italy
Filippi Simonetta  ICRANet and Campus Biomedico, Italy
Jing Yi-Peng  Shangai Astronomy Observatory
Lee Chul Hoon  Hanyang University, Korea
Kim Sang Pyo  Kunsan National University, Korea
Kim Sung-Won  Institute of Theoretical Physics for Asia-Pacific, Korea
Lee Hyun Kyu  Department of Physics, Hanyang University,
Limongi Marco  INAF, Rome, Italy
Lou You Qing  Tsinghua University, Beijing
Malheiro Manuel  ITA, Brazil
Mester John  Stanford University, USA
Mignard François  Observatoire de la Côte d’Azur, Nice, France
Ohanian Hans  Rensselaer Polytechnic Institute, New York, USA
Pacheco José  Observatoire de la Côte d ’Azur, Nice, France
Perez Bergliaffa Santiago  Univesidade do Estado de Rio de Janeiro, Brasil
Pucacco Giuseppe  Università di Tor Vergata Roma
Sepulveda Alonso  University of Antioquia, Colombia
Song Doo Jong  National Institute of Astronomy, Korea
Starobinsky Alexei  Landau Institute for Theoretical Physics, Russia
<table>
<thead>
<tr>
<th>Name</th>
<th>Affiliation</th>
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<tbody>
<tr>
<td>Vissani Francesco</td>
<td>Gran Sasso National Laboratories, Italy</td>
</tr>
<tr>
<td>Wiltshire David</td>
<td>University of Canterbury, New Zealand</td>
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</tbody>
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### Research Scientists

<table>
<thead>
<tr>
<th>Name</th>
<th>Institution</th>
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<tbody>
<tr>
<td>Bernardini Maria Grazia</td>
<td>ICRANet and Università di Roma “Sapienza”, Italy</td>
</tr>
<tr>
<td>Cherubini Christian</td>
<td>Campus Biomedico, Rome, Italy</td>
</tr>
<tr>
<td>Geralico Andrea</td>
<td>ICRANet and Università di Roma “Sapienza”, Italy</td>
</tr>
<tr>
<td>Izzo Luca</td>
<td>ICRANet and Università di Roma “Sapienza”, Italy</td>
</tr>
<tr>
<td>Lattanzi Massimiliano</td>
<td>University of Oxford and ICRANet</td>
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<tr>
<td>Patricelli Barbara</td>
<td>ICRANet and Università di Roma “Sapienza”, Italy</td>
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<tr>
<td>Rotondo Michael</td>
<td>ICRANet and Università di Roma “Sapienza”, Italy</td>
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### Visiting Scientists

<table>
<thead>
<tr>
<th>Name</th>
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<tbody>
<tr>
<td>Abishev Medeu</td>
<td>Al-Farabi Kazakh National University, Kazakhstan</td>
</tr>
<tr>
<td>Bittencourt Eduardo</td>
<td>CBPF, Brasil</td>
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<tr>
<td>Corvino Giovanni</td>
<td>University of Rome La Sapienza, Italy</td>
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<tr>
<td>Gell-Mann Murray</td>
<td>Sante Fe Institute, USA</td>
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<tr>
<td>Kim Huyong Yee</td>
<td>INJE, South Korea</td>
</tr>
<tr>
<td>Mohammadi Rohollah</td>
<td>Isfahan University of Technology, Pakistan</td>
</tr>
<tr>
<td>Mosquera Cuesta Herman</td>
<td>CBPF, Brasil</td>
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<tr>
<td>Perez Martinez Aurora</td>
<td>Instituto de Cibernetica Matematica Y Fisica, Cuba</td>
</tr>
<tr>
<td>Piechocki Wlodzimierz</td>
<td>Institute for Nuclear Studies, Poland</td>
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<tr>
<td>Qadir Asgar</td>
<td>National University Of Sciences And Technology, Pakistan</td>
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<tr>
<td>Raffaelli Bernard</td>
<td>Université de Corse, France</td>
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<tr>
<td>Romero Gustavo E.</td>
<td>Instituto Argentino de Radioastronomia IAR-CONICET, Argentina</td>
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<tr>
<td>Van Putten Maurice</td>
<td>Korean Institute for Advanced Study, South Korea</td>
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</table>
## International Relativistic Astrophysics Ph. D.

<table>
<thead>
<tr>
<th>Cycle</th>
<th>Period</th>
<th>Name</th>
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<tbody>
<tr>
<td>First Cycle</td>
<td>2002-05</td>
<td>Peirani Sebastien</td>
<td>France</td>
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<tr>
<td>Second Cycle</td>
<td>2003-06</td>
<td>Bernardini Maria Grazia</td>
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<td></td>
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<td>Mattei Alvise</td>
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<td>Mercuri Simone</td>
<td>Italy</td>
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<tr>
<td>Third Cycle</td>
<td>2004-07</td>
<td>Chiappinelli Anna</td>
<td>France</td>
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<td>Cianfrani Francesco</td>
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<td>Rotondo Michael</td>
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<td>Yegoryan Gegham</td>
<td>Armenia</td>
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<tr>
<td>Fourth Cycle</td>
<td>2005-08</td>
<td>Battisti Marco Valerio</td>
<td>Italy</td>
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<tr>
<td></td>
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<td>Dainotti Maria.Giovanna</td>
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<td>Khachatryan Harutyun</td>
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<td>Lecian Orchidea Maria</td>
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<td>Pizzi Marco</td>
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<td>Pompi Francesca</td>
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<tr>
<td>Fifth Cycle</td>
<td>2006-09</td>
<td>Caito Letizia</td>
<td>Italy</td>
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<td>De Barros Gustavo</td>
<td>Brasil</td>
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<td>Minazzoli Olivier</td>
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<td>Rangel Lemos Luis Juracy</td>
<td>Brazil</td>
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<td>Rueda Hernandez Jorge Armando</td>
<td>Colombia</td>
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<tr>
<td>Sixth Cycle</td>
<td>2007-2010</td>
<td>Ferroni Valerio</td>
<td>Italy</td>
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<td>Izzo Luca</td>
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<td>Kanaan Chadia</td>
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<td>Pugliese Daniela</td>
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<td>Sigismondi Costantino</td>
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<tr>
<td>Seventh Cycle</td>
<td>2008-2011</td>
<td>Belvedere Riccardo</td>
<td>Italy</td>
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<td>Ceccobello Chiara</td>
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<td>Ferrara Walter</td>
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<td>Han Wen-Biao</td>
<td>China</td>
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<td>Luongo Orlando</td>
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<td>Pandolfi Stefania</td>
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<tr>
<td></td>
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<td>Taj Safia</td>
<td>Pakistan</td>
</tr>
</tbody>
</table>
Eighth Cycle 2009-2012
Boshkayev Kuantay Kazakhstan
Bravetti Alessandro Italy
Ejlli Damian Albania
Haney Maria Germany
Lombardi Caterina Antonietta Italy
Menegoni Eloisa Italy
Sahakyan Narek Armenia
Sahini Sahil India

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

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

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

IRAP Ph. D. Erasmus Mundus Students

First Cycle 2010-2013
Baranov Andrey Russia
Benedetti Alberto Italy
Dutta Parikshit India
Fleig Philipp German
Machado De Oliveira Fraga Bernardo Brazil
Gruber Christine Austria
Liccardo Vincenzo Italy
Martins De Carvalho Sheyse Brazil
Penacchioni Ana Virginia Argentina
Valsan Vineeth India

Second Cycle 2011-2014
Begue Damien France
Dereli Husne Turkey
Gregoris Daniele Italy
Iyyani, Shabnam Syamsunder India
Pereira, Jonas Pedro Brazil
Pisani Giovanni Italy
Rakshit Suvendu India
Sversut Arsioli Bruno Brazil
Wu Yuanbin China
Third Cycle

Bardho, Onelda
Enderli, Maxime
Filina, Anastasia
Galstyan, Irina
Gomes De Oliveira, Fernanda
Khorrami, Zeinab
Ludwig, Hendrik
Sawant, Disha
Strobel, Eckhard

2012-2015

Albania
France
Russia
Armenia
Brazil
Iran
Germany
India
Germany
Administrative and Secretarial Staff

ICRANet - Pescara

Adamo Cristina  Administrative Office
Del Beato Annapia  Documentation Office
Di Berardino Federica  Head of the Secretarial Office
Latorre Silvia  Administrative Office
Regi Massimo  System Manager (till September 2012)

ICRANet – Nice

Barbaro Pina

ICRANet Br – Rio de Janeiro

London Luzia
Belinski Vladimir

Position: ICRANet, Faculty Member
Period covered: December 2011-December 2012

I. Scientific Work
1. Exact solutions in General Relativity. The explicit analytical resolution of the problem of a physical equilibrium state for two charged rotating masses in General Relativity have been achieved and the final results have been published in papers (Ref.1, Ref.2) where it was constructed the exact analytic solution of the Einstein-Maxwell equations for two charged rotating sources separated by the well defined positive distance and free of struts or of any other pathologies.

2. It was found the new and more solid way (with respect to our past investigations) of derivation of the Kerr solution by adding to the Schwarzschild black hole a solitonic whirl. The main problem here were to integrate the Lax pair equations for the Schwarzschild background in order to find the background spectral matrix. The corresponding calculations were performed (this was the main technical achievement) and with this approach we can have a new interpretation of the distribution of energy of the Kerr black hole between its rotational and rest parts (Ref.3).

3. Cosmology. The work on the book ”Cosmological Singularity” has been continued. The project is in progress and an official agreement with Cambridge University Press will be accomplished soon (Ref.4).

4. Quantum Fields. The previous work (V.Belinski, 2009) on the problem of particle creation by the physical Schwarzschild black hole created by the collapse have been elaborated and supplemented by the exact analysis of what is going on in case of the eternal black hole. It was shown that also for such case there are no way for appearing of any particle creation phenomenon (Ref.5).

2012 List of Publications


Conferences and educational activity
Conferences. The Thirteenth Marcel Grossmann Meeting (MG13), Stockholm University, Sweden, July, 2012.
I Scientific Work

- **Nuclear and Atomic Astrophysics**: We study the nuclear and atomic physics needed to describe the interior of compact stars as white dwarfs and neutron stars. We focus on the properties of nuclear matter under extreme conditions of density and pressure found in these objects. The equation of state of the matter in compact star interiors is studied in detail taking into account all the interactions between the constituents within a full relativistic framework.

- **White Dwarf and Neutron Star Physics and Astrophysics**: The aim is to construct a self-consistent theory of self-gravitating systems obeying relativistic quantum statistics, electromagnetic, weak and strong interactions within the framework of general relativity. Particular attention is given to the study of the effects of the electromagnetic interactions coupled to gravity, which lead for instance to macroscopic gravito-polarization in neutron stars. In the case of white dwarfs, we study the macroscopic influence of the microphysical charge screening between the nuclei lattice and the electronic fluid. The structure properties e.g. the mass-radius relations of both white dwarfs and neutron stars are studied within the above framework. The effects of rotation as well as of high-temperatures on the structure of white dwarfs and neutron stars are also investigated.

- **Emission-Radiation Mechanisms of White Dwarfs and Neutron Stars**: The magnetospheres of magnetized white dwarfs and neutron stars are studied in detail. Both energetics and spectrum of different radiation mechanisms operating in the magnetosphere of compact objects are analyzed and applied to the observations of white dwarfs and neutron star pulsars, soft gamma ray repeaters, anomalous X ray pulsars, and other similar systems.

- **Critical Fields in Neutron Stars and Black Holes**: We study the conditions under which critical electromagnetic fields can develop in neutron stars. The subsequent evolution of the electromagnetic fields during the gravitational collapse of a neutron star to a black hole is also investigated and applied to the physics of extreme astrophysical phenomena like Gamma-Ray-Bursts. The general properties of electrovacuum spacetimes e.g. the Kerr-Newman one are also studied from the theoretical point of view. In particular, the physics and astrophysics related to the dyadosphere of the Reissner-Nordstrom black hole and the dyadotorus of the Kerr-Newman black hole are addressed.

- **Critical fields and Non Linear Electrodynamics Effects in Neutron Stars and Black Holes**: The effects of non-linear electrodynamics minimally coupled to gravity are investigated. New analytic and numeric solutions to the Einstein-Maxwell equations representing black holes or the exterior field of a compact star are obtained and analyzed. Some astrophysical applications are studied in detail e.g. the magnetosphere of a neutron star or the extractable energy of black holes and its role in the emission of Gamma Ray Bursts.

- **Exact Electrovacuum Solutions of the Einstein-Maxwell equations in Astrophysics**: We analyze the ability of analytic exact solutions of the Einstein-Maxwell equations to describe the exterior spacetime of compact stars like white dwarfs and neutron stars. The problem of matching between interior and exterior spacetimes is addressed in detail. The effect of the quadrupole moment on the properties of the spacetime is also investigated. Particular attention is given to the application of
exact solutions in astrophysics, e.g. the dynamics of particles around compact stars and its relevance in astrophysical systems like X ray binaries.

- **Physics and Astrophysics of Gamma Ray Bursts**: The progenitors and emission mechanisms leading to the most energetic radiation observed in astrophysics, the Gamma Ray Bursts (GRBs), are studied. Focus is given to the termed GRB-Supernova connection and to Short GRBs. The binary progenitors of these systems are studied in detail with particular emphasis on the role played by neutron stars.

### II Conferences and educational activities

#### II a. Conferences and Other External Scientific Work

- 3rd Colombian Meeting of Astronomy and Astrophysics, November 5-9, 2012 Bucaramanga (Colombia).
- IRAP Ph. D. Erasmus Mundus School, September 3-21, 2012 Nice (France).

#### II b. Work With Students

- With Riccardo Belvedere (IRAP Ph. D student 3rd year): We construct neutron star equilibrium configurations by integrating numerically the set of self-consistent ground-state equilibrium equations for neutron taking into account quantum statistics, electromagnetic, weak, and strong interactions, within the framework of general relativity. The mass-radius of neutron stars is obtained for selected parameterizations of the nuclear model. Uniformly rotating neutron stars are also constructed. The stability limits of rotating configurations are investigated: the boundaries of mass-shedding and secular axisymmetric instabilities are obtained. Explicit comparisons of globally and locally neutral neutron stars are made.
- With Kuantay Boshkayev (IRAP Ph. D student 3rd year): We study the equilibrium configurations of uniformly rotating white dwarfs and neutron stars within the Hartle formalism. Particular attention is given to the rotation instabilities of rapidly rotating stars e.g. mass-shedding and axisymmetric (secular) instabilities.
- With Sheyse Martins de Carvalho (Erasmus Mundus Ph. D student 3rd year): We study the equilibrium configurations of uniformly rotating white dwarfs and neutron stars within the Hartle formalism. Particular attention is given to the rotation instabilities of rapidly rotating stars e.g. mass-shedding and axisymmetric (secular) instabilities.
- With Jonas Pedro Pereira (Erasmus Mundus Ph. D student 2nd year): We study the influence of the temperature on the properties of white dwarfs and neutron stars. The extension of the relativistic Feynman-Metropolis-Teller equation of state to the case of finite temperatures is studied. The results are applied to both white dwarfs and neutron stars. The effect of high-temperatures relevant to newly born neutron stars and to neo-neutron stars is also investigated. We study as well the effects of the temperature on the structure and on the gravito-polarization effects studied in the degenerate approximation of neutron stars.
- With Yuanbin Wu (Erasmus Mundus Ph. D student 2nd year): The effects of non-linear electrodynamics minimally coupled to gravity are investigated. New analytic and numeric solutions to the Einstein-Maxwell equations representing black holes or the exterior field of a compact star are obtained and analyzed. Some astrophysical applications are studied in detail e.g. the magnetosphere of a neutron star or the extractable energy of black holes and its role in the emission of Gamma Ray Bursts. The equations of motion of particles in these spacetimes are also investigated.
- With Diego Leonardo Cáceres Uribe (IRAP Ph. D. Student 2nd year): As a consequence of global neutrality, the core-crust interface of neutron stars develops a very strong electric field thousands of times the critical field for vacuum polarization. The equilibrium conditions of such an interface boundary are investigated, the relation between surface and Coulomb energy, as well as the generalization of the Bohr-Wheeler equilibrium condition of the nucleus for macroscopic giant nucleus as a neutron star is, are investigated.
- With Yuanbin Wu (Erasmus Mundus Ph. D student 2nd year): The magnetospheres of magnetized white dwarfs and neutron stars are investigated. The luminosity and spectrum of different radiation mechanisms operating in the magnetosphere of compact objects are analyzed and applied to the observations of white dwarfs and neutron star pulsars, soft gamma ray repeaters, anomalous X ray pulsars, and other similar systems.
II c. Diploma thesis supervision


2012 List of Publications

a. Refereed Journals

- R. Belvedere, K. Boshkayev, Jorge A. Rueda, R. Ruffini, On globally neutral uniformly rotating neutron stars, to be submitted.
- K. Boshkayev, L. Izzo, Jorge A. Rueda, R. Ruffini, SGR 0418+5729 and Swift J1822.3-1606 as massive fast rotating highly magnetic white dwarfs, to be submitted.
- J. Pereira, H. Mosquera-Cuesta, Jorge A. Rueda, R. Ruffini, The mass-formula of black holes in general relativity minimally coupled to non-linear electrodynamics, to be submitted.
- S. Martins de Carvalho, Jorge A. Rueda, R. Ruffini, The relativistic Feynman-Metropolis-Teller equation of state at finite temperatures, to be submitted.
- S. Martins de Carvalho, Jorge A. Rueda, R. Ruffini, On the mass-radius relation of general relativistic white dwarfs at finite temperatures, to be submitted.
• Jorge A. Rueda, R. Ruffini, From nuclei to white dwarfs to neutron stars, Int. J. Mod. Phys. D (2012); in press.


b. Contributions to the Proceedings of Meetings and Workshops

• R. Belvedere, Jorge A. Rueda, R. Ruffini, S.-S. Xue, Neutron star equilibrium configurations within a fully relativistic theory with strong, weak, electromagnetic, and gravitational interactions, Current Issues on Relativistic Astrophysics, South Korea (2012).

• K. Boshkayev, Jorge A. Rueda, R. Ruffini, SGRs and AXPs AXPs as Massive Fast Rotating Highly Magnetized White Dwarfs, Current Issues on Relativistic Astrophysics, South Korea (2012).

• S. Martins de Carvalho, Jorge A. Rueda, R. Ruffini, On the relativistic Feynman-Metropolis-Teller equation of state at finite temperatures and low-mass white dwarfs, Current Issues on Relativistic Astrophysics, South Korea (2012).


• S. Martins de Carvalho, Jorge A. Rueda, R. Ruffini, On the relativistic Feynman-Metropolis-Teller equation of state at finite temperatures and low-mass white dwarfs, 13th Marcel Grossmann Meeting, Sweden (2012).


• R. Belvedere, Jorge A. Rueda, R. Ruffini, S.-S. Xue, Neutron star equilibrium configurations within a fully relativistic theory with strong, weak, electromagnetic, and gravitational interactions, 13th Marcel Grossmann Meeting, Sweden (2012).

• Jorge A. Rueda, SGRs and AXPs as massive fast rotating highly magnetized white dwarfs, 39th COSPAR Scientific Assembly, India (2012).

• R. Belvedere, Jorge A. Rueda, R. Ruffini, Moment of inertia, radii, surface emission from a new theoretical understanding of Neutron Stars, 39th COSPAR Scientific Assembly, India (2012).


• R. Belvedere, Jorge A. Rueda, R. Ruffini, Neutron star equilibrium configurations within a fully relativistic theory with strong, weak, electromagnetic, and gravitational interactions, CompStar: the physics and astrophysics of compact stars, Tahiti (2012).


Ruffini Remo

Position: Director ICRANet

Curriculum Vitae:

- Doctorate in Physics, University of Rome, 1966.
- Assistant Professor, Princeton University, 1971-74.
- Member Institute for Advanced Study, Princeton, N.J. 1974-76.
- Visiting professor Kyoto University (Japan), 1975.
- Visiting professor University of Western Australia, Nedlands (Australia), 1975.
- Professor University of Catania, Italy, 1976-78.
- Professor, Chair of Theoretical Physics, University of Rome “la Sapienza”, 1978-2012
- Member Council of Center. International Physics, Bogotà, Colombia, 1984-
- President International Center Relativistic Astrophysics (ICRA), 1985-
- Director of ICRANet, 2005-present
- Member of Task Force Scientific Use of Space Station NASA, Washington, 1986-88.
- Chairman International Organizing Committee of Marcel Grossmann Meetings, 1984-
- Member of Consiglio Ricerche Astronomiche, Rome, 1987-91.
- Co-Chairman Italian-Korean Meetings on Relativistic Astrophysics, Rome and Seoul, 1987-
- Chairman William Fairbanks Meetings, 1990-
- Member of the Board of ENEA, 2004-
- Co-Director Advanced Series in Astrophysics and Cosmology-World Scientific, Singapore, 1986
- 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:
  o Fellow of the American Physical Society 1974-
  o Alfred P. Sloan Foundation fellow, 1974-76.
  o Space Scientist of the Year Award, 1992.
  o Honorary Professor of University of Kirghizia 1998-

Main Scientific Publications:
Coauthor, among others, of the following books:
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,
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,

2012 List of Publication
Evidence for a proto-black hole and a double astrophysical component in GRB 101023

Cooling of young neutron stars in GRB associated to supernovae
R. Negreiros, R. Ruffini, C.L. Bianco, J.A. Rueda

A double component in GRB 090618: a proto-black hole and a genuinely long gamma-ray burst

Analysis of GRB 080319B and GRB 050904 within the fireshell model: evidence for a broader spectral energy
distribution

Electron and Positron pair production in gravitational collapse
W. B. Han, R. Ruffini, S. S. Xue

Phase space evolution of pairs created in strong electric fields
A. Benedetti, R. Ruffini and G.V. Vereshchagin
Reference accepted in Physics Letters A, 2012

Gravitational field of compact objects in general relativity
Boshkayev K., Quevedo H., and Ruffini

GRB 090618: A Candidate of a Neutron Star Gravitational Collapse to a Black Hole Induced by a Type Ib/c Supernova
L. Izzo, Jorge A. Rueda, R. Ruffini
Reference Astronomy and Astrophysics, 2012, in press

On the Induced Gravitational Collapse of a Neutron Star to a Black Hole by a Type Ib/c Supernova
Rueda, Jorge A.; Ruffini, Remo

SGRs and AXPs as Rotation-Powered Massive White Dwarfs
Malheiro, Manuel; Rueda, Jorge A.; Ruffini, Remo
Reference Astronomical Society of Japan, 2012, v. 64, n. 3, Article No.56

Neutron star equilibrium configurations within a fully relativistic theory with strong, weak, electromagnetic, and gravitational interactions
Belvedere, Riccardo; Pugliese, Daniela; Rueda, Jorge A.; Ruffini, Remo; Xue, She-Sheng

Grb 090227b: The Missing Link Between The Genuine Short And Long Grbs
M. Muccino, R. Ruffini, C.L. Bianco, L. Izzo, A.V. Penacchioni
Reference The Astrophysical Journal, 2012 IN PRESS

Space-Time Evolution of Electric Fields in Cores of Compact Stars
W. B. Han, R. Ruffini, S. S. Xue
I. Scientific Work

The work focused on mainly the following aspects:

• Monte Carlo simulations of the photospheric emission in GRBs (with D. Begue and I.A. Siutsou)
  We studied the decoupling of photons from ultra-relativistic spherically symmetric outflows expanding with constant velocity by means of Monte-Carlo (MC) simulation. For outflows with finite width we confirm the existence of two regimes: photon thick and photon thin introduced recently by Ruffini, Siutsou, Vereshchagin (2011). The probability density function of photon last scattering is shown to be very different in these two cases. We also obtained spectra as well as light curves. In photon thick case, the time integrated spectrum is much broader than the Planck function and its shape is well described by the fuzzy photosphere approximation. In the photon thin case we confirm the crucial role of photon diffusion, hence the probability density of decoupling has a maximum near the diffusion radius, well below the photosphere. Its spectrum has Band shape. It is produced when the outflow is optically thick and its peak is formed at diffusion radius.

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

• Evolution of the pair plasma generated by a strong electric field (with A. Benedetti and R. Ruffini)
  Creation, acceleration and interactions of electron-positron pairs are studied numerically using the relativistic kinetic Boltzmann equation. We focus on long term evolution of the created uniformly distributed optically thick plasma, its thermalization and interaction with photons. Instead of spherical symmetry in the phase space traditionally used in kinetic theory, we adopt cylindrical symmetry, which appears to be more convenient in the problem under consideration.

• Bose enhancement and Pauli blocking in the pair plasma (with I.A. Siutsou, A.G. Aksenov and R. Ruffini)
  Interactions in homogeneous electron-positron-photon plasma are studied numerically using the relativistic kinetic Boltzmann equation, with collision integrals including Bose enhancement and Pauli blocking corrections. The new method of computing collision integrals is developed.

• Photospheric emission from ultrarelativistic outflows (with I.A. Siutsou and R. Ruffini)
  Emission from expanding spherically symmetric plasma becoming optically thin to Compton scattering is studied with particular attention to relativistic effects. Observed flux and spectra are obtained. These results find applications in the theory of Gamma Ray Bursts.

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

• Comptonization of photons near the photosphere of GRBs (with A.G. Aksenov and R. Ruffini)
  We consider the formation of photon spectrum at the photosphere of ultrarelativistically expanding outflow. We use the Fokker-Planck approximation to the Boltzmann equation, and obtain the generalized...
Kompaneets equation which takes into account anisotropic distribution of photons developed near the photosphere. This equation is solved numerically in two interesting examples, and the results are discussed and compared to those obtained by alternative methods.

II. Conferences and educational activities

II a. Conferences and Other External Scientific Works

II b. Work With Students
Marco Muccino

II c. Diploma thesis supervision
- Ivan Siutsou (IRAP PhD student, Belarus)
- Alberto Benedetti (Erasmus Mundus IRAP PhD student, Italy)
- Damien Begue’ (Erasmus Mundus IRAP PhD student, France)

II d. Other Teaching Duties
- “First light from Gamma Ray Bursts”, 3 lectures at IRAP Ph.D. Erasmus Mundus September school, Nice, 3 – 21 September, 2012
- “Relativistic kinetic theory and its applications in astrophysics and cosmology”, 5 lectures at XV Brazilian School of Cosmology and Gravitation, Mangaratiba - Rio de Janeiro – Brazil, August 19 - September 1, 2012

III. Service activities

III a. Within ICRANet
- Member of the IRAP PhD Faculty
- Editing the proceedings of the 12th Italian-Korean Symposium on Relativistic Astrophysics held in ICRANet, Pescara, Italy on July 4-8, 2011

III b. Outside ICRANet
- Served as expert in the PhD commission of Chiara Ceccobello, University of Ferrara, 15 March 2012
- Served as expert in the PhD commission of Valentina Mantovani Sarti, University of Ferrara, 15 March 2012
- Referee for Astrophysical Journal

2012 List of Publications

• Monte Carlo simulations of the photospheric emission in GRBs (with D. Begue and I.A. Siutsou)
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- Electron-positron plasma in GRBs and in cosmology (with R. Ruffini)
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  Interactions and emission in a spherical region with optically thick relativistic plasma is studied using kinetic Boltzmann equations. High initial optical depth are considered, which results in radial self acceleration giving mildly relativistic velocities of expansion. Results of this work may be applied for future laboratory experiments aimed in creation of optically thick electron-positron pairs.

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II. Conferences and educational activities

II a. Conferences and Other External Scientific Works
- Review talk “Physics of non-dissipative ultrarelativistic photospheres” at GRB1 parallel session, XIII Marcel Grossmann Meeting, Stockholm, 1-7 July 2012.

II b. Work With Students
Marco Muccino

II c. Diploma thesis supervision
- Ivan Siutsou (IRAP PhD student, Belarus)
- Alberto Benedetti (Erasmus Mundus IRAP PhD student, Italy)
- Damien Begue` (Erasmus Mundus IRAP PhD student, France)
II. d. Other Teaching Duties

• “First light from Gamma Ray Bursts”, 3 lectures at IRAP Ph.D. Erasmus Mundus September school, Nice, 3 – 21 September, 2012
• “Relativistic kinetic theory and its applications in astrophysics and cosmology”, 5 lectures at XV Brazilian School of Cosmology and Gravitation, Mangaratiba - Rio de Janeiro – Brazil, August 19 - September 1, 2012

III. Service activities

III a. Within ICRANet

• Member of the IRAP PhD Faculty
• Organized parallel session GRB1 - Photospheric Emission in GRBs at MGXIII in Stockholm, 1-7 July, 2012
• Editing the proceedings of the 12th Italian-Korean Symposium on Relativistic Astrophysics held in ICRANet, Pescara, Italy on July 4-8, 2011

III b. Outside ICRANet

• Served as expert in the PhD commission of Chiara Ceccobello, University of Ferrara, 15 March 2012
• Served as expert in the PhD commission of Valentina Mantovani Sarti, University of Ferrara, 15 March 2012
• Referee for Astrophysical Journal

2012 List of Publications

Xue She-Sheng

Position: Staff
Period covered: 2011 – 2012

I. Scientific Work

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


The Klein first integrals in an equilibrium system with electromagnetic, weak, strong and gravitational interactions, Jorge A. Rueda, Remo Ruffini, and She-Sheng Xue, Nuclear Physics A 872 (2011) 286


Electron-positron pairs production in a macroscopic charged core

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

Electron-positron pair oscillation in spatially inhomogeneous electric field and radiation
Wen-Biao Han, Remo Ruffini, and She-Sheng Xue

Detailed Discussions and Calculations of Quantum Regge Calculus of Einstein-Cartan theory

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

Euler-Heisenberg Lagrangian and photon circular polarization
Iman Motie and She-Sheng Xue, European Physics Letter (EPL) 100 (2012) 17006

On the self-consistent equilibrium equations of neutron stars,

Neutrinos and photons travel in a discrete space-time

The phase and critical point of quantum Einstein–Cartan gravity

High Energy Neutrino Oscillation at the Presence of the Lorentz Invariance Violation
Electron and positron pair production in gravitational collapse

Neutron star equilibrium configurations within a fully relativistic theory with strong, weak, electromagnetic, and gravitational interactions

II. Conferences and educational activities
International Conferences, ICRANet meetings
Presenting talks and posters in international ICRANet meetings:
3rd Galileo-Xu Guangqi meeting (Beijing, China, Oct 2011)
12th Italian-Korean meeting (Pescara, July 2012)
The meeting for Italian-Korean cooperation, Seoul 5-6, Nov 2012
The first LeCosPA Symposium: Towards Ultimate Understanding of the Universe, Taipei Taiwan Feb 6-9, 2012

Diploma thesis supervision
IRAP PhD. Faculty, thesis supervision and reading and examination
Ivan, Siutsou, Han Wenbiao, Christine Gruber, Yuanbin Wu, Wang Yu, Handrik Ludwig, Eckhard Strobel and Iranian students: Rohoollah Mohammadi, Iman Moti, and Ehsan Bavarsad

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

Other Teaching and working Duties
Teaching courses in Nice and Les Houches schools for IRAP Ph.D. Erasmus Mundus students
Discussion and Work With the Director R. Ruffini, V. Belinski and other Faculty members, Carlo Luciano Bianco, G. Vereshchagin, and Jorge Rueda, and other students on Gamma Ray Bursts and Neutron stars...
Discussion and work with External Professors
H. Kleinert, Pascal Chardonnet, Lou Yu Qing and other ICRANet visitors.

III. Service activities
Within ICRANet
Participating organization of ICRANet Seminars
Give a public lecture in ICRANet Pescara center.
Adjunct Professors of the Faculty
Aharonian Felix A.

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

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

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

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

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

Organization of International Workshops, Symposia, Schools (2012)

Publications: approximately 400 papers in peer review journals – approximately 18,000 citations

Papers published in 2012 (in peer-reviewed journals)

HESS collaboration papers:
10 papers in Astronomy and Astrophysics

Invited review papers:


F.A. Aharonian, Gamma Rays from Supernova Remnants, Astroparticle Physics, in press
Amati Lorenzo

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

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

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

I Scientific Work
My scientific collaboration with ICRANet is focused on Gamma-Ray Burst (GRB) astrophysics, with particular emphasis on the testing of the fireshell model against X-ray and gamma-ray data of the prompt emission. In particular, in 2012 we concentrated on the identification and interpretation of “disguised” short GRBs (e.g., Bianco, Amati et al., Mem. Sait. S., 2012), based also on their location and evolution in the $E_{p,i}$ – $E_{iso}$ plane, the evidence and explanation of thermal components in prompt emission spectra, the investigation within the fireshell model of GRBs showing a prompt emission characterized by a double component, the first of which dominated by thermal emission (e.g., GRB 101023, Penacchioni et al., A&A, 2012).

Besides my collaboration with ICRANet, my main scientific activity includes: spectral, timing and correlation properties of GRBs (e.g., Frontera, Amati et al., ApJ, 2012), investigation of the cosmological use of GRBs (e.g., Amati, IJMP S, 2012), X-ray spectral and timing properties of X-ray binaries (e.g., Farinelli, Amati et al., MNRAS, 2012), study of the scientific case and concept design of GRB detectors for future missions (e.g., Feroci et al., Exp. Astron., 2012). Under this last respect, in particular, in 2012 I continued to collaborate with Prof. Braga (Director of INPE, Brazil) on the possibility of putting an Italian payload devoted to GRB studies on board future Brazilian satellites, I was the p.i. of the GAME (GRB and All-sky Monitor Experiment) for the ESA Call for Small Mission (again, also in collaboration with Brazil), and I continued coordinating the GRB Science Working Group of the LOFT mission (in the framework of the ESA/M3 assessment phase).

II Conferences and educational activities
Conferences and Other External Scientific Work
October 2012: XX SIGRAV Conference, Napoli, Italy (invited oral presentation)
September 2012: Second LOFT Science Meeting, Toulouse, France (oral presentation)
September 2012: Third Italian National Workshop on GRBs - "Lampi su Napoli", Napoli, Italy (oral presentation)
July 2012: 13th Marcel Grossmann Meeting - MG13, Stockholm, Sweden (solicited oral presentation)
June 2012: 9th Workshop on Science with the New Generation of High Energy Gamma-ray Experiments, Lecce, Italy (invited oral presentation)
June 2012: First National Meeting on Science and Technology with SKA - The Italian pathway to SKA Rome, Italy (invited oral presentation)
May 2012: Gamma-Ray Bursts 2012 Conference, Munich, Germany (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 A. Penacchioni on data analysis and interpretation of the “double component” GRB 101023A).
Lecturer at the IRAP Ph.D. Erasmus Mundus School, September 2012, University of Nice, France

III Service activities
Within ICRANet
- Chairperson of the parallel session “Cosmology from GRBs” at the 13th Marcel Grossmann Meeting (Stockholm, July 2012)
- Member of Commissions for the Discussion of the Thesis of IRAP PhD Students at Rome University “La Sapienza”.

Outside ICRANet
- Member of the Editorial Board of “ISRN Astronomy & Astrophysics” (HINDAWI), “Galaxies” (MDPI) and
- Member of the Board for Relativistic and Particle Astrophysics of the Italian National Institute for Astrophysics (INAF)
- Member of the of the Faculty of the PhD course in Physics at the University of Ferrara

2012 list of Publications
Referred


Conference proceedings


Chakrabarti Sandip Kumar

Position:
Dean (Academic Programme), Head (Astrophysics and Cosmology) and Senior Professor, S.N. Bose National Centre for Basic Science, Kolkata and
In Charge (Academic Affairs), Indian Centre for Space Physics, Kolkata

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 200 papers in International Refereed journal and a similar number of papers in Proceedings. He has written a book and edited several volumes.

II Conferences and educational activities

Doctorate Students Supervision
He has produced 20 Ph. D. scholars and another 10 students are registered for PhD. Five students are submitting their thesis soon. Three more students have joined since last year. One student from Nigeria are presently working under his supervision. The students mainly worked on (a) Monte Carlo simulations of spectral and timing properties in presence of jets and outflows; (b) Outbursting black holes; (c) Quasi-periodic Oscillations of several black holes (d) Transonic accretion flows with heating and cooling; (e) Spectral properties of accretion disks having shock waves; (f) Formation of simple bio-molecules during star formation and Grain chemistry using Monte-Carlo simulations etc. (g) Ionospheric change in presence of terrestrial and extra-terrestrial high energy phenomena including seismic activities.

III Service activities

Talks/papers
Feb. 2012: ISRO RESPOND meeting lectures at Physical Research Laboratory.


July, 2012: Invited talks on "Towards the most complete accretion flow solution around black holes" at 13th marcel grossman meeting, Stockholm.

July, 2012: Invited talks on "Balloon programme at the Indian Centre for Space Physics", "Towards the most complete solution of accretion/winds around black holes", "VLF activities and ICSP and SNBNCBS", "Formation of Pre-biotic Molecules during the Formation of proto-stars and the Origin of Life”, A 2D hydrodynamic simulations coupled to chemical evolution to study the physics and chemistry of ISM” at the 39th COSPAR meeting at Infosys Campus, Mysore, India.

July, 2012: "Trend of the Studies on Chemical Evolution and Origin of Life” at the International Conference on "Chemical Evolution in Star Forming Region" at SNBNCBS

August, 2012: "My Experiments with Astrophysics” Bose colloquium at SNBNCBS
2012 List of Publication

Papers in Journals:


Papers in Proceedings:


I. Scientific Work

1. Numerical simulation of formation of cyclone vortex flows in the intratropical zone of convergence and their early detection
   Mingalev, I. V.; Astaf’eva, N. M.; Orlov, K. G.; Chechetkin, V. M. et al.
   Source: COSMIC RESEARCH Volume: 50 Issue: 3 Pages: 233-248 DOI: 10.1134/S0010952512020062 Published: MAY 2012

2. Possibility of explaining the existence of vortexlike hydrodynamic structures based on the theory of stationary kinetic equations
   Belotserkovskii, O. M.; Fimin, N. N.; Chechetkin, V. M.
   COMPUTATIONAL MATHEMATICS AND MATHEMATICAL PHYSICS Volume: 52 Issue: 5 Pages: 815-824 DOI: 10.1134/S096554251205003X Published: MAY 2012

3. Dynamics of an ultra-relativistic, collisionless astrophysical plasma
   Chechetkin, V. M.; Dyachenko, V. F.; Ginzburg, S. L.; et al.
   ASTRONOMY REPORTS Volume: 56 Issue: 5 Pages: 329-335 DOI: 10.1134/S1063772912040026 Published: MAY 2012

   Aksenov, A. G.; Chechetkin, V. M.
   ASTRONOMY REPORTS Volume: 56 Issue: 3 Pages: 193-206 DOI: 10.1134/S1063772912030018 Published: MAR 2012

5. Magneto-rotational Instability in the Accreting Envelope of a Protostar and the Formation of the Large-Scale Magnetic Field
   Velikhov, E. P.; Sychugov, K. R.; Chechetkin, V. M.; et al.
   ASTRONOMY REPORTS Volume: 56 Issue: 2 Pages: 84-95 DOI: 10.1134/S106377291201009X Published: FEB 2012

6. The Development of Large-Scale Instability in Keplerian Stellar Accretion Disks
   Lugovskii, A. Yu.; Chechetkin, V. M.
   ASTRONOMY REPORTS Volume: 56 Issue: 2 Pages: 96-103 DOI: 10.1134/S1063772912020047 Published: FEB 2012

II. Conferences and educational activities

II a. Conferences and Other External Scientific Works


II b. Work With Students
1. Filina Anastasiia, Explosive burning in stellar condition, M I PH U , Moscow, Russia
2. Blokhin Konstantin, Remnant of supernova around compact neutron star, M I PH U , Moscow, Russia

II c. Diploma thesis supervision
Sychugov Konstantin, MRI in young stars.
Damour Thibault

Position: Professeur Permanent
Institut des Hautes Etudes Scientifiques.
Period covered: 2012

Conferences and educational activities
ICRANET-related Collaborations with
Donato BINI
Alessandro NAGAR
Hermann NICOLAI

2012 List of publications
1. Gravitational radiation reaction along general orbits in the effective one-body formalism.
   e-Print: arXiv:1210.2834 [gr-qc]
   Abstract:
   We derive the gravitational radiation-reaction force modifying the Effective One Body (EOB) description of
   the conservative dynamics of binary systems. Our result is applicable to general orbits (elliptic or hyperbolic)
   and keeps terms of fractional second post-Newtonian order (but does not include tail effects). Our derivation
   of radiation-reaction is based on a new way of requiring energy and angular momentum balance. We give
   several applications of our results, notably the value of the (minimal) 'Schott' contribution to the energy, the
   radial component of the radiation-reaction force, and the radiative contribution to the angle of scattering
   during hyperbolic encounters. We present also new results about the conservative relativistic dynamics of
   hyperbolic motions.

2. Gravitational self-force and the effective-one-body formalism between the innermost stable circular orbit
   and the light ring.
   e-Print: arXiv:1209.0964 [gr-qc]
   Abstract:
   We compute the conservative piece of the gravitational self-force (GSF) acting on a particle of mass m₁ as it
   moves along an (unstable) circular geodesic orbit between the innermost stable circular orbit (ISCO) and the
   light ring of a Schwarzschild black hole of mass m₂≫m₁. More precisely, we construct the function
   huu(x)=hμνuμuν (related to Detweiler's gauge-invariant 'redshift' variable), where hμν is the regularized
   metric perturbation in the Lorenz gauge, uμ is the four-velocity of m₁, and x≡[Gc⁻³(m₁+m₂)Ω]²/³ is an
   invariant coordinate constructed from the orbital frequency Ω. In particular, we explore the behavior of huu
   just outside the 'light ring' at x=1/3, where the circular orbit becomes null. Using the recently discovered link
   between huu and the piece a(u), linear in the symmetric mass ratio ν, of the main radial potential A(u,ν) of
   the Effective One Body (EOB) formalism, we compute a(u) over the entire domain 0≤u≤1/3 (extending
   previous results for u≤1/5). We find that a(u) \[it diverges\] like ≈0.25(1−3u)⁻¹/₂ at the light-ring limit, explain
   the physical origin of this divergent behavior, and discuss its consequences for the EOB formalism. We
   construct accurate global analytic fits for a(u), valid on the entire domain 0≤u≤1/3 (and possibly beyond), and
   give accurate numerical estimates of the values of a(u) and its first 3 derivatives at the ISCO. In previous
   work we used GSF data on slightly eccentric orbits to compute a certain linear combination of a(u) and its
   first two derivatives, involving also the O(ν) piece d¹(u) of a second EOB radial potential D¹(u,ν). Combining
   these results with our present global analytic representation of a(u), we numerically compute(d) on the
   interval 0≤u≤1/6.
3. Measurability of the tidal polarizability of neutron stars in late-inspiral gravitational-wave signals.
Published in Phys.Rev. D85 (2012) 123007
e-Print: arXiv:1203.4352 [gr-qc]
Abstract:
The gravitational wave signal from a binary neutron star inspiral contains information on the nuclear equation of state. This information is contained in a combination of the tidal polarizability parameters of the two neutron stars and is clearest in the late inspiral, just before merger. We use the recently defined tidal extension of the effective one-body formalism to construct a controlled analytical description of the frequency-domain phasing of neutron star inspirals up to merger. Exploiting this analytical description we find that the tidal polarizability parameters of neutron stars can be measured by the advanced LIGO-Virgo detector network from gravitational wave signals having a reasonable signal-to-noise ratio of $\rho=16$. This measurability result seems to hold for all the nuclear equations of state leading to a maximum mass larger than $1.97M_\odot$. We also propose a promising new way of extracting information on the nuclear equation of state from a coherent analysis of an ensemble of gravitational wave observations of separate binary merger events.

Published in Class.Quant.Grav. 29 (2012) 184001
e-Print: arXiv:1202.6311 [gr-qc]
Abstract:
We review several theoretical aspects of the Equivalence Principle (EP). We emphasize the unsatisfactory fact that the EP maintains the absolute character of the coupling constants of physics while General Relativity, and its generalizations (Kaluza-Klein,..., String Theory), suggest that all absolute structures should be replaced by dynamical entities. We discuss the EP-violation phenomenology of dilaton-like models, which is likely to be dominated by the linear superposition of two effects: a signal proportional to the nuclear Coulomb energy, related to the variation of the fine-structure constant, and a signal proportional to the surface nuclear binding energy, related to the variation of the light quark masses. We recall the various theoretical arguments (including a recently proposed anthropic argument) suggesting that the EP be violated at a small, but not unmeasurably small level. This motivates the need for improved tests of the EP. These tests are probing new territories in physics that are related to deep, and mysterious, issues in fundamental physics.

5. Effective action approach to higher-order relativistic tidal interactions in binary systems and their effective one body description.
Published in Phys.Rev. D85 (2012) 124034
e-Print: arXiv:1202.3565 [gr-qc]
Abstract:
The gravitational-wave signal from inspiralling neutron-star–neutron-star (or black-hole–neutron-star) binaries will be influenced by tidal coupling in the system. An important science goal in the gravitational-wave detection of these systems is to obtain information about the equation of state of neutron star matter via the measurement of the tidal polarizability parameters of neutron stars. To extract this piece of information will require to have accurate analytical descriptions of both the motion and the radiation of tidally interacting binaries. We improve the analytical description of the late inspiral dynamics by computing the next-to-next-to-leading order relativistic correction to the tidal interaction energy. Our calculation is based on an effective-action approach to tidal interactions, and on its transcription within the effective-one-body formalism. We find that second-order relativistic effects (quadratic in the relativistic
gravitational potential $u=\frac{G(m_1+m_2)}{(c^2 r)}$ significantly increase the effective tidal polarizability of neutron stars by a distance-dependent amplification factor of the form $1+\alpha_1 u+\alpha_2 u^2+...$ where, say for an equal-mass binary, $\alpha_1=5/4=1.25$ (as previously known) and $\alpha_2=85/14\approx 6.07143$ (as determined here for the first time). We argue that higher-order relativistic effects will lead to further amplification, and we suggest a Padé-type way of resuming them. We recommend to test our results by comparing resolution-extrapolated numerical simulations of inspiralling-binary neutron stars to their effective one body description.

6.
Energy versus Angular Momentum in Black Hole Binaries.
e-Print: arXiv:1110.2938 [gr-qc]
Abstract:
Using accurate numerical relativity simulations of (nonspinning) black-hole binaries with mass ratios 1:1, 2:1 and 3:1 we compute the gauge invariant relation between the (reduced) binding energy $E$ and the (reduced) angular momentum $j$ of the system. We show that the relation $E(j)$ is an accurate diagnostic of the dynamics of a black-hole binary in a highly relativistic regime. By comparing the numerical-relativity ENR($j$) curve with the predictions of several analytic approximation schemes, we find that, while the usual, non-resummed post-Newtonian-expanded EPN($j$) relation exhibits large and growing deviations from ENR($j$), the prediction of the effective one-body formalism, based purely on known analytical results (without any calibration to numerical relativity), agrees strikingly well with the numerical-relativity results.

Future research plans of T. Damour
The main topics I intend to investigate in the near future are:
1. Development of the Effective One Body (EOB) formalism in several directions: improvement in the treatment of non spinning bodies, new ways of dealing with spinning bodies,…
2. Study of the quantum dynamics of Bianchi universes in supergravity
3. Development of the Gravity/Coset conjecture of Damour-Henneaux-Nicolai, and, in particular, further study of the tower of constraints (hopefully representing a generalization of the algebra of diffeomorphisms).
Frontera Filippo

Position: Full Professor University of Ferrara
Period covered: 2012

I Scientific Work
Experimental and observational X-/gamma-ray astronomy, in particular:
   a. Gamma-ray lens development with long focal length (LAUE project);
   b. Preparation of the mission proposal GAME submitted to ESA in response to the ESA call for small missions;
   c. Observational studies of GRB prompt emission;
   d. Observational studies of Compact objects in binary systems

II Conferences and educational activities
II a Conferences and Other External Scientific Work
   a. EMJD IRAP-PhD school, Nice, Sept 2012
   c. Workshop on X-ray diffraction in the Centennial from its discovery by Max von Laue, Accademia Lincei, Rome, May 2012
   d. 13th Marcel Grossmann Meeting, July 2012
   e. 3rd National Conference on GRBs, Naples, Sept 2012

II b Work With Students
   yes, with
   a) 1 PhD student in Physics (Caterina Lombardi), University of Ferrara-IRAPP-PhD program
   b) 2 PhD students (Vincenzo Liccardo, Vineeth Valsan), EMJD-IRAP-PhD program
   c) 1 PhD student (Disha Sawant), EMJD-IRAP-PhD program

II c Other Teaching Duties
Two courses at UNIFE, one “Astronomical Observations” to undergraduate students in Physics, the other “Measures and Observations of Celestial X- and gamma-rays” to Master Students in Physics.

II d. Work With Postdocs
Yes, with two PostDocs E.Virgilli and R. Farinelli, at Physics Department, University of Ferrara

III. Service activities
III a. Within ICRANet
   Lectures to PhD students

III b. Outside ICRANet
   Director of the PhD program in Physics, University of Ferrara

2012 List of Publications

2. Frontera, Filippo; Amati, Lorenzo; Farinelli, Ruben; Guidorzi, Cristiano; Landi, Raffaella; Titarchuk, Lev; in’t Zand, Jean J. M., Time Resolved Spectra of GRBs Simultaneously Detected with BATSE and BeppoSAX/WFCs, International Journal of Modern Physics Conference Series (IJMPCS), vol. 12, issue 01, pp. 136-145 (2012)


Jantzen Robert

Position: Professor
Period covered: Summer 2011 through Summer 2012

I. Scientific Work
Continuing collaboration with Donato Bini and Andrea Geralico on mathematical properties of stationary spacetimes and with Remo Ruffini on Fermi and electromagnetic mass.

II. Conferences and educational activities
Continuing MG13 organizational and editorial duties

2012 List of Publication
Separable geodesic action slicing in stationary spacetimes
D. Bini, A. Geralico and R.T. Jantzen

On Fermi’s resolution of the ’4/3 problem’ in the classical theory of the electron: hidden in plain sight
D. Bini, A. Geralico, R.T. Jantzen and R. Ruffini,
in book Fermi, Einstein, Heisenberg and Relativistic Astrophysics: Personal Reflections,

Fermi and Electromagnetic Mass
R.T. Jantzen and R. Ruffini

Proceedings of the Twelfth Marcel Grossmann Meeting on General Relativity (2009)
T. Damour, R.T. Jantzen, R. Ruffini, Eds.,

On the Mathematics of Income Inequality: Splitting the Gini Index in Two
R.T. Jantzen and K. Volpert

Scattering of particles by radiation fields: a comparative analysis
D. Bini, A. Geralico, M. Haney and R.T. Jantzen
Khalatnikov Isaak

Position: Visiting Professor
Period covered: 22 October – 22 November 2012

I Scientific Work
1. Discussions on the Euler- Tricomi problem in Relativistic Hydrodynamics (with V. Belinski)

2. Discussions on the quantum creation of the universe by gravitational instanton of Wheeler- De Witt equation (with G. Vereshchagin)

II Conferences and educational activities
13th Marcel Grossmann Meeting (Stockholm, July 2012)
Lee Hyung Won

Position: Professor, Inje University
Period covered: 8 July 2012 – 22 July 2012

I Scientific Work
1. Dark energy
2. Exact solution of Einstein equations
3. Numerical Relativity
4. Neutrino Physics

II Conferences and educational activities
II a Conferences and Other External Scientific Work
1. The 13th MG meeting, Stokholm, 1 July 2012 – 7 July 2012.

2012 List of Publication
Quevedo Hernando

Position: Full Profesor (Universidad Nacional Autónoma de México) 
Adjunct Professor (ICRANet) 
Period covered: December 2011 – November  2012

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

II. Conferences and educational activities
II a. Conferences and Other External Scientific Works
Visiting Professor at the Kazakh National University  (Almaty, Kazakhstan, March-May, 2012)

II b. Work With Students
ICRANet students:
- Kuantay Boshkayev 
  Topic: Exact and approximate metrics in relativistic astrophysics
- Orlando Luongo (PhD)
  Topic: Geometrothermodynamics in general relativity and cosmology
- Alessandro Bravetti (PhD)
  Topic: Topological and geometric properties of the thermodynamic phase space

UNAM students:
- Lorena Campuzano (MSc)
  Topic: Geometrothermodynamics of cosmological models
- Francisco Nettel (PhD)
  Topic: Topological quantization in string theory
- Diego Tapias (PhD)
  Topic: Geometric description of thermodynamic processes
- Saken Toktarbay (PhD)
  Topic: Relativistic compact objects
- David Garcia (PhD)
  Topic: Sasakian metrics in geometrothermodynamics
- Daniel Soto (MSc)
  Topic: Topological quantization of the Reissner-Nordström black hole
- Antonio Ramirez (BSc)
  Topic: Geometrothermodynamics of the van der Waals gas
- Edgar Gasperin (BSc)
  Topic: Motion of test particles in the field of naked singularities
- Sasha Zaldivar (BSc)
  Topic: Geometrothermodynamics of quantum gases
II d. Other Teaching Duties
- Geometrothermodynamics: An introduction (graduate students course - KazNU)

II e. Work With Postdocs
- Dr. Alberto Sanchez (UNAM)
  Topic: Geometrothermodynamics and statistics of black holes
- Dr. Cesar Lopez (UNAM)
  Topic: Relativistic and non-equilibrium thermodynamics
- Dr. Calixto Gutierrez (UNAM)
  Topic: Disk-halo systems in relativistic astrophysics
- Orlando Luongo (UNAM)
  Topic: Applications of geometrothermodynamics in cosmology
- Daniela Pugliese (Queen Mary College)
  Topic: Motion of test particles in the Kerr-Newman spacetime

2012 List of Publications

Rafelski Johann

Position: Professor of Physics and Member of the Theoretical Astrophysics Program at The University of Arizona, Tucson, Arizona

Scientific Areas of Interest Include
a) Study of Early Universe in the Era of Quark-Hadron Phase of Matter
b) Quantum Vacuum State in Strong Fields and Particle Production
c) Properties of Compact Ultra Dense Objects (CUDO)

Selected Conferences
SpacePart12: Particle Physics in Space Conference, CERN Nov. 5-7, 2012,
Invited Lecture on: Connecting QGP-RHI physics to the Early Universe

Krakow School of Theoretical Physics, Zakopane, May, 2012 three lectures on:
From Quark-Gluon Plasma to Neutrino Decoupling

Rome Symposium in Honor of Remo Ruffini, University Rome La Sapienza, May 18, 2012
Solar System Signatures of Impacts by Compact Ultra Dense Objects

Leung Center for Cosmology and Particle Astrophysics, National University, Taipei, Taiwan, Symposium, “Towards Ultimate Understanding of the Universe”, February 6-9, 2012 on Critical Acceleration

Work With ICRAnet Associates and Students
Lecture Series presented on March 5,6,7, 2012
Discovery of Quark-Gluon Plasma
Quark-Gluon Plasma in the Early Universe
Renaissance of Strong Field Physics: Critical Acceleration and Laser Pulses

Discussions With Faculty and Associates on
Effort to formulate particle production in time dependent supercritical fields
Search for improved understanding of Nonlinear Electromagnetism
Models of ultra-dense matter

ICRAnet Service activities
Member of Steering Committee of ICRAnet

Session organization and session chair at
MG13 Marcel Grossmann Meeting, Stockholm, Sweden July 1-7 2012

Selected 2012 Publication


Rosati Piero

Position: Full Astronomer at the European Southern Observatory (Garching b. München)
Period covered: Jan-Nov 2012
http://ww.eso.org/~prosati

I Scientific Work
Most of my scientific activity this year focused on the CLASH project: Cluster Lensing and Supernova survey with Hubble, as PI of the ESO Large Programme: Dark Matter Mass Distributions of Hubble Treasury Clusters and the Foundations of ΛCDM Structure Formation Models”. Publication of science results from this project, including several press releases, have been ramping up this year (see publications below) and will continue to expand in 2013. Other scientific work was devoted to a) the discovery and study of distant galaxy clusters, and their implication for Cosmology; b) the development of the Wide Field X-ray Telescope mission (see http://www.wfxt.eu).

II Conferences and educational activities
II a Conferences and Other External Scientific Work
• “First results from CLASH: calibrating cluster masses” - Invited Talk presented at “Clusters as Cosmological probes”, Ringberg Castle (Germany), Nov 20, 201
• “Present and Future Surveys of Galaxy Clusters” - Invited Review presented at “X-ray Astronomy: Towards the Next 50 years”, Milano (Italy), Oct 1-6, 2012
• “High-z Lensed Galaxies from CLASH” - Invited Talk presented at “Bologna High-z Workshop”, Bologna, June 5-6, 2012
• “CLASH-VLT: First Results” - Talk presented at Beyond ΛCDM, Sexten (Italy), July 2-6, 2012
• “Testing the ΛCDM scenario with galaxy clusters across cosmic time” JHU Colloquium presented at Johns Hopkins University, Baltimore (MD), 10 May 2012
• Organized Conference (SOC co-Chair) of “Growing-up at high redshift: from proto-clusters to galaxy clusters” – ESAC, Spain, Sept 10-13, 2012
• Organized workshop “Beyond ΛCDM” at the Sesto Center for Astrophysics, July 2012, Sexten, Italy

II b Work With Students
Ulricke Kuchner (Univ. of Vienna) “Galaxy populations in CLASH clusters” (started in Sept 2012)

II c Other Teaching Duties
Series of Lectures at XVIIAG/USP Advanced School on Astrophysics Radio-astronomy, Galaxies and clusters at high-z: “Structure Formation and Cosmology with High-z Clusters”, 4-9 November, 2012 - Itatiba/SP, Brazil (http://www.astro.iag.usp.br/~xivieaa/)

II d. Work With Postdocs: documented in several publications below

III. Service activities
III a. Within ICRANet: N/A this year
III b. Outside ICRANet:
• Telescope Allocation Committee for NASA/Chandra (Boston, Jun 25-27 2012)
• Junior PI in Cluster of Excellence “Origin and Structure of the Universe” (Garching) - Research Area E
• European Lead and deputy PI of the Wide Field X-ray Telescope mission (new NASA/RFI proposal submitted in Oct 2011)
• Member of the Euclid consortium
• Referee for the Italian Evaluation of Research Quality (ANVUR)

2012 List of Publication (refereed only, accepted as of 31 Oct 2012)
1. D. Coe et al. (23 coauthors including P. Rosati) 2012

2. W. Zheng et al. (36 coauthors including P. Rosati) 2012
   A magnified young galaxy from about 500 million years after the Big Bang, Nat, 489, 406


5. J. Kurk et al. (15 coauthors including P. Rosati) 2012

   Probing ionizing radiation of L < 0.1L* star-forming galaxies at z> 3 with strong lensing, A&A, in press (arXiv:1205.4028)

7. M. Moresco et al. (68 coauthors including P. Rosati) 2012
   Improved constraints on the expansion rate of the Universe up to z ~ 1.1 from the spectroscopic evolution of cosmic chronometers, JCAP08(2012)006, (arXiv:1201.3609)

8. K. Umetsu et al. (21 coauthors including P. Rosati) 2012

9. S. Mei et al. (21 coauthors including P. Rosati) 2012

    Probing dark energy with the next generation X-ray surveys of galaxy clusters, MNRAS, 423, 2503

    Deep Chandra observation of the galaxy cluster WARPJ1415.1+3612 at z = 1: an evolved cool-core cluster at high-redshift, A&A, 539, 10

12. Zitrin, P. Rosati, M. Nonino, C. Grillo, M. Postman et al. 2012 CLASH:
New Multiple-Images Constraining the Inner Mass Profile of MACS J1206.2−0847, ApJ, 749, 97

13. Talia, M. et al. (16 coauthors including P. Rosati) 2012
GMASS ultradeep spectroscopy of galaxies at $z \sim 2$ VII. Star formation, extinction, and gas outflows from UV spectra, A&A, 539, 61


17. Pierini, A. et al. (31 coauthors including P. Rosati) 2012 First simultaneous optical/near-infrared imaging of an X-ray selected, high-redshift cluster of galaxies with GROND: the galaxy population of XMMU J0338.7+0030 at $z = 1.1$, A&A, 540, 45


Lecturers
Aksenov Alexey

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

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

II Conferences and educational activities
2012: 13th Marcel Grossmann Meeting :: Stockholm July 2012; High Energy Astrophysics Dec Moscow

III Service activities
Within ICRANet
2012 Visitor at Icranet 2 months

Outside ICRANet
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

2012 List of Publications


Alekseev George A.

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

I. Scientific Work
Further development of the theory of integrable reductions of Einstein’s field equations and its applications in General Relativity and gravity, string gravity and supergravity models in four and higher dimensions. This work includes a collaboration with Prof. V.A. Belinski on various aspects of soliton theory, construction and physical interpretation of exact solutions of Einstein and Einstein - Maxwell equations including his studies of equilibrium configurations of the fields of two massive charged rotating sources of the Kerr-Newman type.

II Conferences and educational activities

II a Conferences and Other External Scientific Work
International conference: MG-13
Talk-1: G.A. Alekseev, “Exact solutions in four and higher dimensions. State of the Art.”
Abstract In this short communication, various mathematical aspects of constructing exact solutions of Einstein’s field equations for various gravity, string gravity and supergravity models were described: a large existing experience of development and applications of different solution generating methods for vacuum Einstein equations and electrovacuum Einstein – Maxwell equations in four dimensions and, on the other hand, the lack of similar systematic methods for generating solutions for integrable reductions of different (symmetry reduced) gravity models in higher dimensions. Some related results and specific difficulties concerning constructing solutions in space-times of five dimensions are also mentioned and briefly discussed.

Talk-2: G.A. Alekseev, "Monodromy transform and the integral equation method for solving the string gravity and supergravity equations in four and higher dimensions"
Abstract The monodromy transform and corresponding integral equation method described here give rise to a general systematic approach for solving integrable reductions of field equations for gravity coupled bosonic dynamics in string gravity, supergravity and pure vacuum gravity in four and higher dimensions. For string gravity in space-times of $D \geq 4$ dimensions with $d=D-2$ commuting isometries and any number $n$ of Abelian vector gauge fields the equivalent spectral problem allows to parameterize the infinite-dimensional space of local solutions by two pairs of coordinate-independent holomorphic $d \times d$ and $d \times n$ matrix functions of the spectral parameter $w$ -- the monodromy data for the fundamental solution of our spectral problem. We construct the linear singular integral equations which determine the solutions for any choice of these monodromy data. For any rational and analytically matched monodromy data the solutions can be found explicitly. Simple reductions of the space of monodromy data lead to solutions for $5D$ minimal supergravity and vacuum gravity in $D \geq 4$ dimensions.

Visits: 1. ICRA (Pescara): 29.05.2012-07.06.2012

2012 List of Publication
Abstract The monodromy transform and corresponding integral equation method described here give rise to a general systematic approach for solving integrable reductions of field equations for gravity coupled bosonic dynamics in string gravity and supergravity as well as for pure vacuum gravity in four and higher dimensions. For physically different types of fields in space-times of $D \geq 4$ dimensions with $d = D - 2$ commuting isometries – stationary fields with spatial symmetries, interacting waves or evolution of partially inhomogeneous cosmological models, the string gravity equations govern the dynamics of interacting gravitational, dilaton, antisymmetric tensor and any number $n \geq 0$ of Abelian vector gauge fields (all depending only on two coordinates). The equivalent spectral problem constructed earlier allows to parameterize the entire infinite-dimensional space of (normalized) local solutions of these equations by two pairs of arbitrary coordinate-independent holomorphic $d \times d$- and $d \times n$-matrix functions $u_{\pm}(w), v_{\pm}(w)$ of a spectral parameter $w$ which constitute a complete set of monodromy data for normalized fundamental solution of this spectral problem. The “direct” and “inverse” problems of such monodromy transform — calculating the monodromy data for any local solution and constructing the field configurations for any chosen monodromy data always admit unique solutions. We construct the linear singular integral equations which solve this inverse problem. For any rational and analytically matched (i.e. $u_+(w) \neq u_-(w)$ and $v_+(w) \neq v_-(w)$) monodromy data the solution of these integral equations and corresponding solution for string gravity equations can be found explicitly. Simple reductions of the space of monodromy data leads to the similar constructions for solving of other integrable symmetry reduced gravity models, e.g. 5D minimal supergravity or vacuum gravity in $D \geq 4$ dimensions.
Bini Donato

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

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

II Conferences and educational activities
Conferences and Other External Scientific Work
Since 1988 I have participated in all the international meetings of the Marcel Grossmann series as well as all the conferences of the ICRA-ICRANet series.

Diploma thesis supervision
I’ve been supervisor of the Diploma thesis of many students at the University of Rome “La Sapienza”, since 1995:

Ph.D thesis supervision
Dr. V. Montaquila, Physics departments of the University of Naples “Federico II.”

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

Work With Postdocs
A Geralico, post-doc student at the University of Rome “La Sapienza.”

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

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

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

2012 List of publications

Published papers

1) Bini D., Geralico A., Jantzen R. T.
Separable geodesic action slicing in stationary spacetimes

2) Bini D., Esposito G., Geralico A.
de Sitter spacetime: effects of metric perturbations on geodesic motion

3) Bini D. and Geralico A.
Scattering by an electromagnetic radiation field

4) Bini D., Falanga M., Geralico A. and Stella L.
The signal from an emitting source moving in a Schwarzschild spacetime under the influence of a radiation field

5) Bini D., Gregoris D. and Succi S.
Radiation pressure vs friction effects in the description of the Poynting-Robertson scattering process

6) Bini D., Geralico A. and Succi S.
Particle scattering by a test fluid on a Schwarzschild spacetime: the equation of state matters

7) Bini D. and Geralico A.
Observer-dependent tidal indicators in the Kerr spacetime
Class. Quantum Grav., vol. 29, 055005, 2012.

8) Bini D., Damour T. and Faye G.
Effective action approach to higher-order relativistic tidal interactions in binary systems and their effective one body description

9) Bini D., Gregoris D., Rosquist K. and Succi S.
Particle motion in a photon gas: friction matters

10) Bini D., Chicone C. and Mashhoon B.
Spacetime Splitting, Admissible Coordinates and Causality

11) Bini D., Kuantay B. and Geralico A.
Tidal indicators in the spacetime of a rotating deformed mass
Class. Quantum Grav., vol. 29, 145003, 2012.

12) Bini D., Geralico A., Haney M. and Jantzen R.T.
Scattering of particles by radiation fields: a comparative analysis

Submitted papers
1) Bini D., Gregoris D., Rosquist K. and Succi S.
Effects of friction forces on the motion of objects in smoothly matched interior/exterior spacetimes
Class. Quantum Grav., submitted, 2012.

2) Bini D., Damour T.
Gravitational radiation reaction along general orbits in the effective one-body formalism

3) Donato Bini, Mariateresa Crosta, Fernando de Felice, Andrea Geralico, Alberto Vecchiato
The Erez-Rosen metric and the role of the quadrupole on light propagation
Classical and Quantum Gravity, submitted 2012

Papers in conference proceedings
1) Bini D., Geralico A.
Equilibrium Orbits of Particles Undergoing Poynting-Robertson Effect in Schwarzschild Spacetime

2) Bini D., Boshkayev K., Ruffini R. and Siutsou I.
Equatorial Circular Geodesics in the Hartle-Thorne Spacetime

3) Bini D., Geralico A.
Slicing black hole spacetimes
Proceedings of the 13th Marcel Grossmann Meeting, July 2-8, 2012, Stockholm (Sweden)

4) Bini D.
Observers, observables and measurements in general relativity
Proceedings of the meeting “ Relativity and Gravitation 100 Years after Einstein in Prague”
Perez Bergliaffa Santiago Esteban

Position: Professor, Department of Physics
University of the State of Rio de Janeiro
Period covered: 2011-2012

I Scientific Work
An analysis of a regular black hole interior.
Daniela Perez, Camila A. Correa, Santiago E. Perez-Bergliaffa, Gustavo E. Romero.
Manuscript being reviewed for publication in Gravitation and Cosmology

A Born-Infeld-like f(R) gravity.
J.C. Fabris, R.S. Perez, N. Pinto-Neto, Santiago Esteban Perez Bergliaffa
arXiv:1205.3458 [gr-qc]
Accepted for publication in PRD

Accretion disks around black holes in modified strong gravity
Daniela Perez, Gustavo Esteban Romero, Santiago E. Perez Bergliaffa
Accepted for publication in Astronomy & Astrophysics

II Conferences and educational activities
II a Conferences and Other External Scientific Work
Static and spherically symmetric black holes with nonlinear electromagnetic source, talk given at the parallel session BH3 of the 13th Marcel Grossmann Meeting on General Relativity, held in Stockholm on July 1-7, 2012.
(Yet) another view of the effective metric, talk given at the Mario Novello’s 70th anniversary symposium, held at CBPF (Rio de Janeiro), on August 15-17, 2012.
Dark energy and inhomogeneous cosmological models, talk given at the 55th meeting of the Asociación Argentina de Astronomia, Mar del Plata (Argentina), September 2012.
The Dark Side of the Universe, colloquium given at the Department of Physics of the CINVESTAV (Mexico City), on February 29, 2012.

Member of the Organizing Committee of the Mário Novello’s 70th Anniversary Symposium, held at CBPF, (Rio de Janeiro), on August 15-17, 2012.

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

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

Daiana Silva, Compact Objects, (UERJ).

II c Diploma thesis supervision
Claudia Isabel Azucena P. Rivasplata, “Applications of the effective metric”, PhD in Physics, co-advisor: José Salim (CBPF).
Florença Anabella Teppa Pannia, “Cosmology and inhomogeneous models”, PhD in Astronomy (University of La Plata, Argentina) – advisor.

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


Other Teaching Duties
I taught several courses at the graduate and post-graduate level in the Institute of Physics of the UERJ.

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

IV Other
Reviewer of Classical and Quantum Gravity.

Reviewer of International Journal of Theoretical Physics.
Reviewer of Physical Review D.

2012 List of Publication
See above.
Wiltshire David L.

Position: Associate Professor, Department of Physics & Astronomy, University of Canterbury, Christchurch, New Zealand

2012 List of Publications


Bernardini Maria Grazia

Position: Postdoctoral Research Fellow
Period covered: 2012

I Scientific Work

I mainly worked on the analysis and interpretation of the observational data of the Swift/X-Ray Telescope (XRT; 0.3-10 keV) and of the Burst Alert Telescope (BAT; 15-150 keV). I was involved in the analysis of all the Swift/XRT GRB observations until December 2010, with the morphological and spectral characterisation of the X-ray light curves (Margutti et al., 2012). The entire data set and analysis will be soon available online for further investigations and for a direct comparison with theoretical models. One of the major outcomes of the X-ray analysis is the identification on a new three-parameter correlation involving X-ray late time and gamma-ray prompt emission parameters, shared by both short and long GRBs (Bernardini et al., 2012). The physical origin of this correlation lies in what is common to the two classes, and likely independent of the progenitors and environment since both are thought to be different. We speculate that the ultimate physical parameter that regulates the GRB properties is the outflow Lorentz factor. Currently I am also working on the XMM Serendipitous Source Catalog (2XMMi-DR3) to develop algorithms able to identify transient emissions among the XMM detections that can be associated either to orphan GRB afterglows or to Supernova shock breakout.

II Conferences and educational activities

II a Conferences and Other External Scientific Work

- “Gamma-Ray Bursts 2012 Conference”, Munich (Germany), May 7-11, 2012.

II b Work With Students

- Co-supervisor of the Ph.D. student Elena Zaninoni at University of Padova, Padova (Italy), January 2010 – December 2012.

II c Other Teaching Duties


2012 List of Publications

REFEREED JOURNALS


CONFERENCE PROCEEDINGS


Cherubini Christian

Position: **University Researcher** (permanent) in Theoretical Physics
Integrated Center for Research (C.I.R.)
Engineering faculty,
University “Campus Bio-Medico”,
Via A. del Portillo 21, I-001285 Rome, Italy.
Period covered: 1st November 2007-today

I Scientific Work

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

II Teaching activities and conference participation

Courses
2011/12 Lecturer “Physics” (Alimentation and Human Nutrition Sciences, Medicine Faculty, University Campus Bio-Medico of Rome).
2011/12 Lecturer “Mathematical Physics Models for Engineering” (Engineering Faculty, University Campus Bio-Medico of Rome).

Conferences
- The Heart Tissue: Modeling and Equations workshop, Brescia (ITALIA)
- 13th Marcel Grossman Meeting, Stoccolma (Svezia)

III Service activities

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

Other

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

2012 List of Publications

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
XIIIth Marcel Grossmann Meeting (Stockholm, SE, 2012)

2012 List of publications
1) Bini D., Esposito G. and Geralico A.,
de Sitter spacetime: effects of metric perturbations on geodesic motion,

2) Bini D., Geralico A. and Jantzen R. T.,
Separable geodesic action slicing in stationary spacetimes,

3) Geralico A. and Luongo O.,
Neutrino oscillations in the field of a rotating deformed mass,

4) Bini D. and Geralico A.,
Scattering by an electromagnetic radiation field,

5) Bini D. and Geralico A.,
Observer-dependent tidal indicators in the Kerr spacetime,

6) Bini D., Falanga M., Geralico A. and Stella L.,
The signal from an emitting source moving in a Schwarzschild spacetime under the influence of a radiation field,
7) Bini D., Geralico A. and Succi S.,
*Particle scattering by a test fluid on a Schwarzschild spacetime: the equation of state matters,*

8) Bini D., Boshkayev K. and Geralico A.,
*Tidal indicators in the spacetime of a rotating deformed mass,*

9) Bini D., Geralico A., Haney M. and Jantzen R. T.,
*Scattering of particles by radiation fields: a comparative analysis,*
Rotondo Michael

Position: Post-doctoral researcher
Period covered: 2011-2012

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

II Conferences and educational activities
II a Conferences and Other External Scientific Work
1) Italian-Korean Symposium on Relativistic Astrophysics, 4-8 July 2011, Pescara (Italy): participant with the talk *The relativistic Feynman-Metropolis-Teller treatment for finite temperatures.*
2) IRAP Ph.D. and Erasmus Mundus Workshop: Recent news from MeV, GeV and TeV gamma rays domain: results and interpretations, 21-26 March 2011, Pescara (Italy): participant with the talk *From atoms to nuclear matter cores of stellar dimensions: a unified approach based on the relativistic Thomas-Fermi model.*

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

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

2011-2012 List of Publication


Visiting Scientists
Bittencourt Eduardo

Position: PhD student
Period covered: from 3 October to 19 October of 2012

I Scientific Work
General relativity and gravitation
Analogue models of gravity and effective geometries
Equivalence between dynamics from field theory formulation

II Conferences and educational activities
II a Conferences and Other External Scientific Work
13th Marcel Grossmann Meeting – 1-7 July Stockholm

II B Other Teaching Duties
Didactic Laboratory – CBPF
Lectures on general relativity – IX CBPF’ school

III Service activities
III a. Within ICRANet
Long-term visiting of Prof. Mario Novello

III b. Outside ICRANet
Ph.D student at Brazilian Center of Physics Research

2012 List of Publication
What is the origin of the mass of the Higgs boson, Physical Review D 86, 063510 (2012)

Gordon Metric Revisited, to be published in Phys. Rev. D.
Medeu Abishev

Position: Head of Theoretical and nuclear physics department, al-Farabi Kazakh National university

1 Scientific Work
GR mechanics, general relativistic N-body problem

2012 List of Publication

1 Abdildin, Meirkhan M.; Abishev, Medeu E.; Beissen, Nurzada A.; Taukenova, Aliya S.
On Optical-Mechanical Analogy in General Relativity

2 Abdildin, Meirkhan M.; Abishev, Medeu E.; Boshkayev, Kuantay A.; Taukenova, Aliya S.
Transformation Law of the Gravimagnetic Field in Harmonic Coordinates
Mohammadi Rohoollah

PhD. in High Energy Physics
Graduated from Department of Physics,
Isfahan University of Technology, Iran
Gender: Male Nationality: Iranian D.O.B: 06/05/1981
Position: Collaboration with ICRANet as Researcher
Period covered: One year

Scientific Work: High Energy Physics and Astrophysics

Conferences and educational activities
Academic background:
Courses passed in PhD:
- Field theory (main references: Introduction with field theory by Peskin).
- Introduction with supersymmetry (specially MSSM)
- Introduction with standard model and grand unified theory (GUT).
- Fairly good introduction with numerical calculations (FORTRAN programming).
Participation in international conferences:
- Summer school on particle physics, 15 June- 15 July 2009, the Abdus Salam International Centre for Theoretical Physics, Trieste, Italy.
- School of particles and Accelerators (IPM),Isfahan, Iran (2009).
- Collaboration with ICRANet as visitor, March-August 2010, Pescara, Italy.
- Second Galileo-XuGuangqi meeting 11-16 July 2010, Ventimiglia- Italy
- 13th Marcel Grossmann meeting 1-7 July 2012, Stockholm-Sweden.
- A few international conferences held in Iran.

Diploma thesis supervision: No
Work With Students: No
Diploma thesis supervision: No
Other Teaching Duties: Teaching in Department of Physics, Isfahan University of Technology, Iran (2005-2010)
Work With Postdocs: No

Service activities Within ICRANet:
- Collaboration with ICRANet as visitor, March-August 2010, Pescara, Italy.
- Collaboration with ICRANet as visitor, November 2011 -December 2013, Pescara, Italy.

Collaboration of Iranian student within ICRANet:
Up to now (in during 2010-1012) three PhD Iranian students have visited ICRANet who finished their thesis (now they are working in Iranian universities) while they keep their collaboration with ICRANet. Iman Moti and Ehsan Bavarsad have visited here for six months. Meanly they worked with Profs. Ruffini and Xue in High Energy Physics and Astrophysics.
2012 List of Publication


4. Mohammadi R., Remo Ruffini and She-Sheng Xue, “Neutron stars in the presence of the strong magnetic Field”, (Second Galileo-XuGuangqi meeting 11-16 July 2010, Ventimiglia-Italy)


Mosquera Cuesta Herman J.

Position: Visiting Professor Universidade Estadual Vale de Acarau, Sobral - CE, Brazil
Period covered: 12 May 2012 – 18 July 2012

I Scientific Work
I have continued my research duties involving Nonlinear Electrodynamics in Astrophysics and Cosmology, in particular in applications to CMB physics, and also to study the characteristics of the polarized radiation from quasars. I also concluded the editing process of two books which are listed below in this annual report.

II Conferences and educational activities
II a Conferences and Other External Scientific Work
International Conference in Numerical Analysis and Applied Mathematics, Kos, Greece, September 18-26, 2012
Mário Novello 70th Anniversary Symposium, Río de Janeiro, August 15-17, 2012

II b Work With Students
Work with ICRANet Erasmus Mundus Ph. D. Student Jonas Pedro Pereira on Applications of Nonlinear Electrodynamics in Relativistic Astrophysics: Prepared article on “Reversible Transformations in Nonlinear Electrodynamics” (To be submitted for publication)

Adviser of Student Luis Henry Nuñez Quiroga in his work leading to Bachelor Degree in Physics – Finished in June 2012, from Department of Physics, Universidad Nacional de Colombia, Bogota

Work with M. Sc. Student Daniel Alfonso Pardo, School of Physics, Universidad Nacional de Colombia, Medellín. Theme of Dissertation: “On Gravitational Waves Astrophysics”, to be presented no later than December 2012.

Adviser of “Work of Conclusion” of Course Licenciatura em Fisica, of student Reginaldo Freitas at Universidade Estadual Vale de Acarau”, in Sobral, Ceará, Brazil

II c Other Teaching Duties
Delivered “Introductory Course on General Relativity” at “Course of Licenciatura em Fisica, Universidade Estadual Vale de Acarau”, in Sobral, Ceará, Brazil. I also prepared the “Academic Program” for the “Course of Specialization in Astrophysics and Cosmology” to offered by Universidade Estadual Vale de Acarau, in Sobral, Ceará, Brazil, within the Sobral Astro Project.

III. Service activities
III a. Within ICRANet
Collaborating with Prof. Remo Ruffini in preparing letters of invitation for other Brazilian institutions to join ICRANet as scientific partners. Also collaborating in providing information to ICRANet Scientific Staff and Research Collaborators regarding the Brazilian Government new program: Science without Frontiers, which opens new avenues for research cooperation among most ICRANet member institutions and Brazilian universities and research centers.

III b. Outside ICRANet
Co-Manager of Sobral Astro Project, an interiorization of science program of the Government of Ceará State, Brazil, in collaboration with General Coordinator Prof. Francisco J. Amaral Vieira, ICRANet Secretary for South-America.
2012 List of Publication

1 - High-energy scalarons as a model for Dark Matter in galaxies
Authors: C. Corda, Herman J. Mosquera Cuesta, Roberto Lorduy Gomez
Published in Astropart. Phys. 35 (2012) 362-370

2 - Nonlinear electrodynamics effects on the evolution of the polarization angle and applications to quasar polarizations
Herman J. Mosquera Cuesta and Gaetano Lambiase
Published: The Astrophysical Journal (Accepted for Publication), (2012)

3 - Farewell to black hole horizons and singularities?
Authors: C. Corda, Darryl Leiter, Herman J. Mosquera Cuesta, Scott Robertson, Ruddy Schild
Published: Journ. Cosmology, 17 (2011) 13

4 - Gravitational Waves Produced by Ejection of Jet Superluminal Components, Precession and Gravitomagnetic Distortion of Accretion Disks in Active Galactic Nuclei, Micro-Quasars, and T-Tauri Stars Dynamically Driven by Bardeen-Petterson Effect
Authors: Herman J. Mosquera Cuesta, Luis A. Sanchez, Daniel Alfonso Pardo, Anderson Caproni and Zulema Abraham
Published: The Open Astronomy Journal, vol. 4, issue 1, pp. 98-107

5 - Irreversible gravitational collapse: black stars or black holes?
Authors: C. Corda, Herman J. Mosquera Cuesta
Published: Hadron. Journ. 34, 2011, 149-159

6 - Nonlinear electrodynamics and CMB polarization
Authors: Herman J. Mosquera Cuesta, Gaetano Lambiase

Author: Herman J. Mosquera Cuesta
Published: Advances in spacecraft technologies, InTech (2011), Chap. 12Th

8 - Inflation from R^2 gravity: A new approach using nonlinear electrodynamics
Authors: C. Corda, Herman J. Mosquera Cuesta
Published: Astropart. Phys. 34 (2011) 587

9 - Gravitational Waves from Ejection of Jet Superluminal Components and Precession of Accretion Disks Dynamically Driven by Bardeen-Petterson Effect
Authors: Herman J. Mosquera Cuesta; Sánchez, Luis A.; Pardo, Daniel Alfonso; Caproni, Anderson; Abraham, Zulema; Quiroga-Nunez, Luis Henry
Published: Intern. Journ. Mod. Phys. Suppl. 3 (2011) 482

Edited Books (2012):
1 - The big challenge of gravitational waves: A new window into the universe
Editors: C. Corda, Herman J. Mosquera Cuesta
Published: Nova Science Publishers, Inc. New York, NY

2 - Space Science

92
Perez Martinez Aurora Maria

Position: Senior Researcher
Period covered: 11-30 June

I Scientific Work
I spent my visit in icranet working in two tasks:
- Self-grativating Fermi sources in presence of magnetic field at finite temperature
- Magnetized quark matter, phase transition and Astrophysical implications

II Conferences and educational activities
II a Conferences and Other External Scientific Work
-I gave a seminar entitled” Magnetized CFL phase: Compact Stars and strangelets”, 22 June, ICRA.Net, La Sapienza Rome.

-I also participated in Marcel Grossmann Meeting in Stockholm, 1-7 July work presented: Magnetized compact stars.

II b Work With Students
Master student: Ismael Delgado from Instituto de Geofísica y Astronomía IGA, Havana Cuba, Ph D student: D. Manreza Paret from Universidad de la Habana and IAG-USP Sao Paulo.

II c Diploma thesis supervision
Ismael Delgado from Instituto de Geofísica y Astronomía IGA, Havana Cuba, thesis in preparation.

III. Service activities
I visited ICTP (from 3-10 June) to attend School on mLearning 4-7 June and the celebration of the 10 Anniversary of eJDS service. I give a talk about the relevance of eJDs for SCF, on behalf of the Cuban Physical Society (SCF), in my condition of Vice president.

IV. Other
1) I discussed with Dr. Herman Mosquera Cuesta the kicks of pulsars and the possible effect of magnetic field.
2) I discussed with Dr. Jorge Rueda the topic of global conservation of charge and its possible role in Quark stars.
3) I discussed with Dr. M Malheiro the role of magnetic field in pulsars and compact stars.
4) Work in collaboration with R. González Felipe, ISTL-Lisbon, Ernesto López Fune and D. Manreza Paret from Havana University: Role of magnetic field and temperature in the properties of Strange Quark Matter.
5) Collaboration with R. Sussman from ICN-UNAM, Alain Ulacia from ICIMAF Havana and Ismael Delgado from IGA from Havana in the field: Self-magnetized matter at finite temperature.

2012 List of Publication
-Gravity induced evolution of a magnetized fermion gas with finite temperature. I. Delgado, A. Perez Martinez, A. Ulacia and R. Sussman (to be sent JCAP nov 2012)
Piechocki Włodzimierz

Position: Professor
Period covered: 16-22/01/2012

I Scientific Work
Collaboration with Prof. V. Belinski on the cosmological singularity problem.

II. Other
Talk: ‘On the dynamics of the Bianchi IX model near the cosmological singularity’, Pescara, Italy, ICRANet (International Center for Relativistic Astrophysics Network), 2012-01-18

2012 List of Publication

Qadir Asghar

Position: Professor Emeritus

I Scientific Work:
A. Research Papers: Math./Phys. (foreign journals) 161
   " (local journals) 03
   Economics (foreign journals) 01
   " (local journals) 15
   Math./Phys. (Int. Conf. Proc.) 22
   Math./Phys. (Loc. Conf. Proc.) 05
   Economics (Loc. Conf. Proc.) 03
B. Books authored: 02
C. Books edited: 17
D. Research level articles published: 24
E. Teaching journal papers: 07
F. Popular articles: 32
G. Research preprints: 50

II Conferences and educational activities
II a Conferences and Other External Scientific Work
(a) International (held abroad) 90;
(b) International (held locally) 35;
(c) National 70;
in the fields of Mathematics, Physics, Economics and the History and Philosophy of Science.

II b Work With Students
(a) Supervised 2 MS theses (at KFUPM);
(b) Supervised 30 M. Phil. dissertations (at QAU), 1 at CAMP;
(c) Supervised 10 Ph.D. theses (at QAU); 6 at CAMP;
(d) Supervising 2 M. Phil. dissertation (at CAMP);
(e) Supervising 3 Ph.D. theses (at CAMP).

III. Service activities
Within ICRANet
Visited ICRANet and attended ICRANet sponsored conferences.

2012 List of Publication
Raffaelli Bernard

Position: Postdoctoral position
Period covered:
- University of Corsica, Sept. 2012 – Aug. 2013

I Scientific Work
Theoretical Physics. Works on Gravitation, Black Holes Physics, Quantum Gravity and Cosmology.

II Conferences and educational activities
II a Conferences and Other External Scientific Work
- ICRA presentation and visit in Roma “La Sapienza” February, 6th, 7th and 9th, 2011.
- ICRANet presentation and visit, in Pescara February 8th, 2012.
- MG13 presentation Stockholm, July 2012

III. Service activities
III a. Within ICRANet
Presentations, collaborations.

III b. Outside ICRANet
Teaching and research at the University of Nice (2011/2012) and at the University of Corsica (2012/2013).
- Teaching: Physics (Mechanics, Special Relativity, Quantum Mechanics, Thermodynamics, Mathematical Tools for Physicists) at undergraduate and graduate level.
- Research: works on Gravitation, Black Hole Physics, Quantum Gravity and Cosmology.

2012 List of Publication

Romero Gustavo E.

Position: Chief Researcher (CONICET), Full Professor (University of La Plata, Argentina). Period covered: 2012

I. Scientific Work
Research on black holes, magnetized plasma, AGNs, microquasars, foundations of general relativity.

II. Conferences and educational activities
II a Conferences and Other External Scientific Work (just 2012):

Relativistic particles in magnetized media around black holes
Expositor: G.E. Romero
13th Marcel Grossmann Meeting.

Accretion disks around Kerr black holes in modified gravity
D. Perez, G.E. Romero.
Expositor: D. Perez.
13th Marcel Grossmann Meeting.

Non-thermal radiation from bowshocks of massive runaway stars G.E. Romero, M.V. del Valle.
Expositor: G.E. Romero

Radiation from black hole accretion in f(R) gravity D. Perez, G.E. Romero.
Expositor: D. Perez

Expositor: F.L. Vieyro

Expositor: F.L. Vieyro

High-Energy Emission from Young and Massive Stellar Objects
G.E. Romero

II. Conferences and educational activities

II a Work With Students
PhD Supervision (La Plata University): 3 students.

II b Other Teaching Duties
Courses on “Introduction to Black Hole Astrophysics” and “Introduction to Relativistic Astrophysics”, both UNLP (2012)

II c. Work With Postdocs
Two posdocs (CONICET).

III. Service activities

Outside ICRANet
CTA SAPO Member
Advise Committee CONICET
Vice-Director (IAR-CONICET)
Member Directive Council, Department of Astronomy and Geophysics, University of La Plata.

IV. Other
Visiting Scientist ICRA-Pescara, July 2012.

2012 List of Publication

Gravitational entropy of black holes and wormholes

An inhomogeneous lepto-hadronic model for the radiation of relativistic jets. Application to XTE J1118+480

Parmenides reloaded
G.E. Romero.

Dark matter and dark energy accretion onto intermediate-mass black holes

New remarks on the Cosmological Argument.

Physical processes in bowshocks from runaway stars. Application to zeta Ophiuchi.

Particle transport in magnetized media around black holes and associated radiation.
From change to spacetime: an Eleatic journey
G.E. Romero.

A model for the high-energy emission from blazars

Modeling gamma-ray emission from the high-mass X-ray binary LS 5039

A two-component model for the high-energy variability of blazars. Application to PKS 2155-304.

Non-thermal processes and neutrino emission from the black hole GRO J0422+32 on bursting state.

AE Aurigae: rst detection of non-thermal X-ray emission from a bow shock produced by a runaway star.

On the origin of the jet-like radio/X-ray morphology of G290.1-0.8.

Adversus singularitates: The ontology of space-time singularities
G.E. Romero.

Philosophical problems of space-time theories
G.E. Romero.

The ontology of space-time singularities
G.E. Romero.
Proceedings of Mario Novello’s 70th Anniversary Symposium.

The non-thermal broadband spectral energy distribution of radio galaxies
G.E. Romero.
IRAP Ph D Students
Argüelles Carlos Raúl

Position: PhD student
Period covered: 2010 / 2013

I Scientific Work

**Self-gravitating system of fermions at finite temperature as a model for galactic Dark Matter**

This work is under the general supervision of Professor Remo Ruffini.

This research is based in a model of self-gravitating fermions at finite temperature in General Relativity to describe dark matter (DM) in galaxies. It is developed in a full FORTRAN code using NAG libraries to solve the integro-differential system of equations. The maximum possible range of the free parameter space of the model is explored, when compared with observations of central dark objects and galactic halos. In particular, it is shown that for very high values of the degeneracy parameter, central objects in galaxies with masses up to the Oppenheimer-Volkoff critical mass can be formed. Nonetheless, for these cases no halo is present. Instead, low-intermediate degenerate systems are analysed, showing that a condensed central configuration can serve as an alternative to super massive Black Holes in galaxies in some cases, and at the same time, a halo is present in the outer regions in agreement with observations.

**Einstein clusters and its applications to particle Dark Matter**

This work is under the general supervision of Professor Remo Ruffini.

The classification of Einstein Clusters based on the analysis of the stability of circular orbits according to the effective potential theory is compared with that resulting from the application of the maximum binding energy criterion. The stability properties are investigated for different choices of the energy density profile. The application of the model to the case of our Galaxy is also studied, showing that a constant energy density is an alternative for a central massive Black Hole. An analysis and review of the composition and lifetime works of dark cluster is also made. The actual constraints on the nature and mass of a particle Dark Matter candidate is studied, linking this to the former work.

**Galactic phenomenology and model constarints, the baryonic and Dark Matter components**

This work is under the general supervision of Professors Marco Merafina (Sapienza University)and Remo Ruffini.

Based on HST photometric and spectroscopic high angular resolution data, analysed in the literature, an study of galactic velocity dispersions and surface brightness is made, to build new observables, i.e. total volumetric mass density, and volumetric luminosity mass density respectively. Then, a Dark Matter (DM)volumetric density is defined out of them in order to be contrasted with Self-gravitating fermionic DM models in different regimes of degeneracy, and put theoretical constarints on the DM particle mass, as well as constrain the baryonic and DM mass composition in galaxies. By now, main attention on dwarf galaxies is given.

**Fermi liquids and fermionic superfluidity as an application to Dark Matter**

This work is under the general supervision of Professor Remo Ruffini.

The Landau’s theory of Fermi liquids is studied, with principal attention on fermionic superfluidity. The changes in the Fermi-Dirac statistics from Fermi ideal gases to Fermi fluids (with weak effective interactions between the particles) is analysed, with main attention in the change on the thermodynamic magnitudes. The effect of this modified Fermi statistics is considered within hydrostatic equilibrium configurations, with views of applicability to big galactic cores, where new physics may appear.
II Conferences and educational activities

II a Conferences and Other External Scientific Work

☐ Astrophysics from the radio to the Submillimetre - Planck and other experiments in temperature and polarization, Bologna-Italy. February (2012). Participant.


  Talk 1: Semi-degenerate self-gravitating system of fermions as Dark Matter in Galaxies II: Core & Halo description.
  Talk 2: On Einstein Clusters and Dark Matter

  Talk: Semi-degenerate self-gravitating system of fermions as Dark Matter in Galaxies II: Core & Halo description.

  Talk: Fermionic Dark Matter and galactic structures at all scales.

☐ Argentinian collaboration with the theoretical-physics group of the Physics department (UNLP): An study of domain wall solutions in Horava gravity has been made in 2010/2012 (arXiv:1008.1915 [hep-th]), Under the supervision of the Dr. Nicolás Grandi.

II b Work With Students

Working with the IRAP and Erasmus Mundus PhD students, Bernardo Fraga and Ivan Siutsou respectively, in the issue of Dark Matter based on the model of Self-gravitating system of fermions.

II c Work With Postdocs

Collaboration with Andrea Geralico (ICRANet postdoc) in the work related with Self-gravitating systems of fermions in General Relativity and Einstein Clusters with Dark Matter applications.

2012 List of Publication


105
Belvedere Riccardo

Position: Post-Doc
Period covered: may 2012-april 2013

I Scientific Work
Working with Professor Ruffini to introduce rotation on the new neutron stars model, following the slow rotation approximation in the Hartle-Thorne formalism. The aim is understand the effect on momentum of inertia, on the energy of the system, eventually on pulsar glitches and so on. Moreover, I’m studying the problem of phase transition between core and crust, again in this new approach.

II Conferences and educational activities
II a Conferences and Other External Scientific Work
• CompStar: the physics and astrophysics of compact stars, Tahiti, French Polynesia, June 4-8 2012.
• 13th Marcel Grossmann Meeting, Stockholm, Sweden, July 1-7 2012.
• 39th COSPAR Scientific Assembly, Mysore, India, July 14-22 2012.
• CompStar 2012 School-Equation of State for Compact Star Interiors and Supernovae, Zadar, Croatia, September 24-28 2012.
• Invited talk to the Catania INFN section, by Prof. Fiorella Burgio, Catania, Italy, October 28-31 2012.

III. Service activities
Outside ICRANet
Assistent professor of the “Thermodynamic and laboratory” course held by Professor Tullio Scopigno at Sapienza-University of Rome, Physics Department, from October 2012 to February 2013 (in progress).

2012 List of Publication
(with R. Ruffini, J. Rueda, S.-S. Xue and D. Pugliese) Neutron star equilibrium configurations within a fully relativistic theory with strong, weak, electromagnetic, and gravitational interactions. Published on Nuclear Physics A Volume 883.
Benetti Micol

Position: Ph.D Student, IX IRAP
Period covered: from November 1st 2011 to 31 October 2012

Scientific Work
In the second year of Ph.D, I worked on updating the constraints on possible features in the primordial inflationary density perturbation spectrum using the latest data from Cosmic Microwave Background (CMB) experiment, like Wilkinson Microwave Anisotropy Probe at 7 years (WMAP7), Atacama Cosmology Telescope (ACT) and South Pole Telescope (SPT), and Luminous Red Galaxies (LRG) data from the Sloan Digital Sky Survey (SDSS). Non-standard large scale features are allowed by data and it is possible to generate them in a cosmological way introducing a sharp step in the inflation potential. Using cosmological data we derived constraints on the position, magnitude and gradient of a possible step; the inclusion of new data significantly improves the constraints respect to older work, especially to smaller angular scales. While we found no clear statistical evidence in the data for extensions to the simplest inflationary model, models with a step provide a significantly better fit than standard featureless power-law spectra.

We have also studied how that step in the inflationary potential could be verified using forthcoming temperature and polarization data from the Euclid satellite mission.

Conferences and educational activities
- Partecipated in XIth School of Cosmology, Gravitational Lenses: their impact in the study of galaxies and Cosmology – Ph.D School, September 17-22 2012, Cargèse, France
- Partecipated in Euclid Mission Conference 2012 – International Conference, May 14-17 2012, Copenhagen, Denmark
- Presented poster in Essential Cosmology for the Netx Generation – Ph.D School, January 16-21 2012, Cancun, Mexico

Within ICRANet
Work with Massimiliano Lattanzi and Stefania Pandolfi on the update of constraints on models with oscillatory features in the primordial power spectrum of scalar perturbations. The results will be publish in Phys. Rev. D

Outside ICRANet:
Work with Jochen Weller and Tommaso Giannantonio on the constraints of Features Inflation Model from the Galaxy Survey and MaxBCG dataset. The work is in progress.
Member of Euclid Collaboration, Science Programme European Space Agency.

2011 List of Publications
Featuring the primordial power spectrum: new constraints on interrupted slow-roll from CMB and LRG data.
Micol Benetti, S. Pandolfi, M. Lattanzi, M. Martinelli, A. Melchiorri
Boshkayev Kuantay

Position: Ph.D. student
Period covered: 2009-2012

I Scientific Work
- Exact and approximate solutions;
- Rotating white dwarfs and neutron stars;
- Description of SGRs and AXPs as massive fast rotating highly magnetized white dwarfs.

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


- Kuantay Boshkayev, Jorge A. Rueda and Remo Ruffini (a talk). Fast Rotating White Dwarfs as Precursors of Type Ia supernovae and Millisecond Pulsars. 39th Cospar Scientific Assembly, July 14-22, 2012 Mysore, India


- Kuantay Boshkayev, Jorge A. Rueda and Remo Ruffini (a talk). SGRs and AXPs AXPs as Massive Fast Rotating Highly Magnetized White Dwarfs . Current Issues on Relativistic Astrophysics 2012, November 5-6, 2012 Seoul, South Korea

III. Service activities
III a. Within ICRANet
Lectures at IRAP Ph.D. Erasmus Mundus school September 3rd - 21st, 2012
- Non-rotating and slowly rotating stars in the Newtonian gravitational theory (Hartle’s approach);
- Non-rotating and slowly rotating relativistic stellar models and their applications.

2012 List of Publication


Bravetti Alessandro

Position: IRAP Ph.D. Student  
Period covered: November 1st, 2009 – to date

I Scientific Work  
Geometrothermodynamics and applications to ordinary systems, black holes and cosmological solutions

II Conferences and educational activities  

II a Conferences and Other External Scientific Work  
Visiting researcher from February 2012 to August 2012 at the National Autonomous University of Mexico, Mexico City, Mexico.

II b Work With Students  
Collaboration with Dr. Orlando Luongo on a project about applications of cosmography to cosmological models

III. Service activities  

III a. Within ICRANet  
Writing of my thesis

III b. Outside ICRANet  
Participation to the Geometrothermodynamics seminar at the National Autonomous University of Mexico, Mexico City, Mexico.

2012 List of Publication


2. A. Aviles, A. Bravetti, S. Capozziello, O. Luongo, Updated constraints on f(R) gravity from cosmography (2012) [arXiv:1210.5149].


Cáceres Uribe Diego Leonardo

Position: PhD. Student

I Scientific Work
I am focused in studying the model of white dwarfs for soft gamma ray repeaters and anomalous X-ray pulsars. We are currently considering the standard theory of pulsars and the proposed models of pulsar magnetospheres, intending to use them later to model the so called white dwarf pulsars. We are specifically interested in the description of the high energy emission in X-ray and Gamma-ray bands. We also consider the efficiency problem of the rotational energy conversion into electromagnetic radiation, both in white dwarfs and neutron star pulsars.

II Conferences and educational activities
II a Conferences and Other External Scientific Work
Assistance to meetings organized by Icra such as:

I am collaborating with Luca Izzo on the analysis and data reduction of X-ray and Gamma-ray spectra of Soft Gamma Ray Repetears and Anomalous X-ray pulsars.
Lecian Orchidea Maria

Position: Visitor
Period covered: 2012

I Scientific Work
Theoretical Astrophysics, General relativity, Early cosmology

II Conferences and educational activities
The dynamics of the Early Universe under the BKL hypothesis in the Misner variables is investigated in the case when a discretized nature of space is hypothesized for the Bianchi IX asymptotical (toward the singularity) model.

2012 List of Publication
Menegoni Eloisa

Position: Ph.D student
Period covered: November 2009 – October 2012

I Scientific Work

II Conferences and educational activities

II a Conferences and Other External Scientific Work

- ‘VIII Mexican School of the Gravitation and Mathematical Physics Division of the Mexican Physical Society: Speakable and Unspeakable in Gravitational Physics’, held in Playa del Carmen, Mexico, 6-12 December 2009.
- ‘Cosmology on the Beach: Essential Cosmology for the Next Generation’ organized by Berkeley Center for Cosmological Physics (USA) and Istituto Avanzado de Cosmologia (Mexico) - Playa del Carmen, Qroo., Mexico, January 11-15,2010.
- ‘IRAP Ph.D Lectures’ Nice Observatoire de la Cote d’Azur, Nice, France, February 1-5, 2010.
- ‘5th Iberian Cosmology Meeting’ in Porto, Portugal, from 29th to 31th of March, 2010, and organized by the ‘Centro de Astrofisica da Universidade do Porto’.
- ‘HORIBA INTERNATIONAL CONFERENCE COSMO/CosPA2010’ at the University of Tokyo, Japan, from 27th of September to 1th of October, 2010.
- Miami2010: A topical conference on elementary particles, astrophysics, and cosmology’ held in Fort Lauderdale (FL), USA, from 14th to 19th of December, 2010.
- Planck: LFI-Core Team’ held in Bologna, Italy, from 17th to 18th of January, 2011.
- Planck: LFI-Core Team’ held in Pasadena, California (USA), from 14th to 18th of February, 2011.
- Planck: LFI-Core Team’ held in Bologna, Italy, from 7th to 10th of March, 2011.
- IRAP Ph.D and Erasmus mundus workshop: Recent News from the MeV, GeV and TeV Gamma-Ray Domains’ held in Pescara, Italy, from 21th to 26th of March, 2011.
- IRAP Ph.D and Erasmus Mundus workshop: From Nuclei to White Dwarfs and Neutron Stars’ held in Les Houches, France, from 3th to 8th of April, 2011.
- ‘Planck Joint Core Team meeting’ held in Paris at the Laboratoire de l’Accelarateur Lineaire Orsay, France, from 2th to 4th of May, 2011.
- ‘School of Astrophysics ‘Francesco Lucchin’, XI Cycle, III Course’ held in Bertinoro, Italy, from 8th to 13th of May, 2011.
- ‘Azores School on Observational Cosmology’, held in Angra do He- roi’smo, Azores, Portugal from 1th– 5th of September, 2011.
- Erasmus mundus-IRAP PhD Lectures Universite de Nice Sophia An- tipolis’, held in Nice, France, from 13th – 15th of September, 2011.
- ‘Planck: JCT-Core Team’ held in Bologna, Italy, from 14th to 18th of November, 2011.
- ‘Scientific and Technical Computing in C++’ held at CASPUR-HPC Department in Rome, Italy, from 29th of November to 2th of December, 2011.
- ‘Cosmology on the Beach: Essential Cosmology for the Next Generation’ organized by Berkeley Center for Cosmological Physics (USA) and Istituto Avanzado de Cosmologia (Mexico) Cancun, Mexico, January 16-20, 2012.
- ‘Planck: CTP-meeting’ held in Ferrara, Italy, from 7th to 10th of February, 2012.
- ‘Planck Conference’ held in Bologna, Italy, on the 16th of February, 2012.
- ‘Scientific and Technical Computing in Fortran95’ held at CASPUR-HPC Department in Rome, Italy, from 17th – 20th of April, 2012.
- EUCLID Consortium Conference held in Copenhagen, Denmark, on the 14th – 18th of May, 2012.

II b Diploma thesis supervisor and title
“CONSTRAINTS ON FUNDAMENTAL PHYSICS FROM COSMIC MICROWAVE BACKGROUND DATA ANALYSIS”  Advisor Prof. Alessandro Melchiorri

II c Other Teaching Duties
TALKS in conferences:
• Poster and Talk ‘New constraints on variations of the fine structure constant from CMB anisotropies’ at XIst Cosmology School, held at IESC, in Cargese, France, from 17th to 21th of September, 2012.
• Poster ‘New constraints on variations of the fine structure constant from CMB anisotropies’ at ‘Cosmology on the Beach: Essential Cosmology for the Next Generation’, conference organized by Berke- ley Center for Cosmological Physics (USA) and Istituto Avanzado de Cosmologia (Mexico) Cancun, Mexico, January 16, 2012.
• ‘Constraining variations on the fine structure constant from next surve- vey experiment’ at ‘3rd Galileo-Xu GuangQi Meeting’, held at National Astronomical Observatory of the Chinese Academy of Sciences, in Beijing, China, from 11th – 15th of October, 2011.
• ‘Cosmological constraints on variations of fundamental constants from CMB data’ at Azores School on Observational Cosmology’, held in Angra do Heroísmo, Azores, Portugal from 1th – 5th of September, 2011.
• ‘Cosmological constraints on variations of fundamental constants from CMB data’ at IRAP Ph.D and Erasmus Mundus Workshop: ‘Recent News from the Mev, GeV and TeV Gamma-Ray Domains’ held in Pescara, Italy, from 21th – 26th of March, 2011.
• ‘Cosmological constraints on variations of fundamental constants’ at Miami2010: A topical conference on elementary particles, astrophysics, and cosmology’ held in Fort Lauderdale (FL), USA, from 14th– 19th of December, 2010.
• ‘Cosmological constraints on variations of fundamental constants’ at ‘Horiba International conference COSMO/CosPA2010’ held at the University of Tokyo, Japan, from 27th of September to 1th of October, 2010.
• ‘New constraints on variations of fundamental constants from CMB anisotropies’ at ‘Iberian Cosmology Meeting’ held in Porto, Portugal, from 29th to 31th of March, 2010.
• ‘New constraints on the fine structure constant from CMB anisotro- pies’ at the Observatoire de la Cote d’Azur, Nice, France (February 4, 2010).

III. Service activities
III a. Within ICRANet:
Ph.D lessons

III b. Outside ICRANet
• Member of Planck-LFI Core Team.
• Member of Euclid collaboration.
• Visiting Student at the JPL (Jet Propulsion Laboratory), Pasadena, California, from 27 of July to 20 of August, 2012, under the supervision of Dr. Graca Rocha and Dr. Loris Colombo.
• Visiting Student at the Institut fu¨r Theoretische Physik University of Heidelberg, Germany, from 6th to 10th of December, 2011, under the supervision of Professor Luca Amendola.
• Visiting Student at JPL (Jet Propulsion Laboratory), Pasadena, Ca- lifornia, from 13 of June to 13 of July, 2011, under the supervision of Dr. Graca Rocha.
• Junior Specialist with fellowship for the Department of Physics and Astronomy at the University of California, Irvine, from June 21 to September 20, 2010 under the supervision of Prof. Asantha Cooray, Full Professor in the Department of Physics and Astronomy.

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

2012 List of Publication
• ‘Future constraints on variations of the fine structure constant from combined CMB and weak lensing measurements’; Matteo Martinelli, Eloisa Menegoni, Alessandro Melchiorri ; Physical Review D, Vol.85, No.12, id. 123526 (2012).


In preparation:
• ‘Cosmological parameter estimations with simulated Planck polarization data’; E. Menegoni, P.Natoli, A. Gruppuso, M. Migliaccio (in preparation).

Conference Proceedings
• ‘New limits on the fundamental constants from the CMB data’ Eloisa Menegoni, Alessandro Melchiorri, Erminia Calabrese, Silvia Galli, to be published as a proceedings for ‘3rdGalileo-Xu Guangqi meeting’ held in Beijing, China.


Muccino Marco

Position: PhD student
Period covered: 2010/2012

I Scientific Work
Gamma Ray Bursts (GRBs)
1) High Energy emission in GRBs, with L. Izzo and Prof. R. Ruffini
2) Genuine Short GRBs, with C.L. Bianco, L. Izzo, A.V. Penacchioni and Prof R. Ruffini
3) Double component GRBs, with C.L. Bianco, L. Izzo, A.V. Penacchioni, G. Pisani and Prof R. Ruffini
4) Accretion processes in the IGC scenario, with C.L. Bianco, L. Izzo, A.V. Penacchioni, G. Pisani, Jorge A. Rueda and Prof R. Ruffini

II Conferences and educational activities
II a Conferences and Other External Scientific Work
1) IRAP Ph.D. Erasmus Mundus Workshop
   Recent News from the Mev, GeV and TeV Gamma-Ray Domains
   March 21-26, 2011 Pescara (Italy)

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

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

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

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

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

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

8) 9th AGILE Science Workshop, Astrophysics with AGILE: Five Years of Surprises, April 16th – 17th, 2012
    ESA-ESRIN, Frascati (Italy)

9) Thirteenth Marcel Grossmann Meeting (MG 13), On Recent Developments on Theoretical and
    Experimental General Relativity, Astrophysics and Relativistic Field Theories, July 1st - 7th, 2012 Stockholm
    (Sweden)

10) IRAP Ph.D. Erasmus Mundus School, September 3rd - 21st, 2012 Nice (France)

II. Service activities
Within ICRANet
2. Lecture: IRAP Ph.D. Erasmus Mundus School, September 3rd - 21st, 2012 Nice (France) “GRB090227B: the missing link between genuine short and long GRBs”

III b. Outside ICRANet

2012 List of Publication


Sigismondi Costantino

Position: Professor

I Scientific Work
High resolution measurements of solar diameter, with a special mission to China in collaboration with OCA to observe the transit of Venus
IRAP/PhD Thesis discussed on 12 december 2011 in cotutele with Nice-Sophia Antipolis University.
Thesis under publication with LAP-LAMBERT obtained CNPq grant as visiting professor at the Observatorio Nacional, Rio de Janeiro, Brasil dec 2012-dec2013 granted by FAPERJ as visiting professor at the Observatorio Nacional, Rio de Janeiro nov2011-nov2012 not used for italian burocratical reasons.

II Conferences and educational activities
II a Conferences and Other External Scientific Work
Science and Faith among the three monotheistic religions, Jerusalem 4-8 dec 2011
The transit of Venus, history and opportunities, Beijing 7 june 2012
Measurement of the diameter of the Sun with the transit of Venus, Rome EWASS 2012 29 june 2012;

II b Work With Students
Professor of Physics and Laboratory at Galileo Ferraris Institute of Rome with 140 students
Astrophysics Lab trainer, Sapienza University of Rome prof. De Bernardis

II c Diploma thesis supervision
Two thesis at University Regina Apostolorum on Anthropic Principle in philosophy and cosmology

II d Other Teaching Duties
Philosophy of astronomy, 3ECTS
Pontificia University Regina Apostolorum

II e. Work With Postdocs
with Eugênio Reis Neto, Obs. Nacional and MAST, Rio de Janeiro

III. Service activities
III a. Within ICRANet
Organization of Clavius fourthcentennial meeting in Pescara, August 2012
Professore a comando at ICRANet september 2012- august 2013

II b. Outside ICRANet
Organization of Gerbert of Aurillac meetings in Rome, Biblioteca Vallicelliana 12 may 2012 and Sapienza University 7 december 2012
IV. Other
Student of Shroud of Turin Studies Diploma (Regina Apostolorum University, Rome)

2012 List of Publication

1) 2012arXiv1211.0448S Sigismondi, Costantino Gerberto e le fistulae: tubi acustici ed astronomici

2) 2012arXiv1211.0438S Sigismondi, Costantino Gerberto e la misura delle canne d’organo


4) 2012arXiv1210.8451X Xie, Wenbin; Sigismondi, Costantino; Wang, Xiaofan; Tanga, Paolo, Venus transit, aureole and solar diameter

5) 2012arXiv1210.8286W Wang, Xiaofan; Sigismondi, Costantino, Geometrical information on the solar shape: high precision results with SDO/HMI


7) 2012EAS....55..393S Sigismondi, C., Solar diameter with 2012 Venus Transit

8) 2012EAS....55..389R Raponi, A.; Sigismondi, C.; Guhl, K.; Nugent, R.; Tegtmeier, A., Solar limb darkening function and solar diameter with eclipse observations

9) 2012EAS....55..381S Sigismondi, C.; Raponi, A.; De Rosi, G.; Bianda, M.; Ramelli, R.; Caccia, M.; Maspero, M.; Negrini, L.; Wang, X., Atmospheric fluctuations below 0.1 Hz during drift-scan solar diameter measurements

10) 2012arXiv1206.0712S Sigismondi, Costantino, Solar diameter with 2012 Venus transit: history and opportunities

11) 2012arXiv1203.0476S Sigismondi, Costantino, Christopher Clavius astronomer and mathematician

12) 2012arXiv1202.1071S Sigismondi, Costantino, The astrometric recognition of the solar Clementine gnomon (1702)

13) 2012IJMPS..12..229S Sigismondi, Costantino, Sunsets and Solar Diameter Measurement

14) 2012arXiv1201.6463S Sigismondi, C., Low frequency seeing and solar diameter measurements

15) 2012arXiv1201.6094S Sigismondi, Costantino, Gerbert of Aurillac: astronomy and geometry in tenth century Europe


18) 2012arXiv1201.0707R Raponi, Andrea; Sigismondi, Costantino; Guhl, Konrad; Nugent, Richard; Tegtmeier, Andreas, Eclipse, solar limb darkening function and diameter measurements: toward a unified approach
19) 2012arXiv1201.0510S Sigismondi, Costantino, Measuring the position of the center of the Sun at the Clementine Gnomon of Santa Maria degli Angeli in Rome

20) 2012IJMPS..12..405S Sigismondi, Costantino; Raponi, Andrea; Bazin, Cyril; Nugent, Richard, Towards a Unified Definition of Solar Limb during Central Eclipses and Daily Transits


22) 2011arXiv1112.6398S Sigismondi, Costantino, The partial asteroidal occultation of Betelgeuse on Jan 2, 2012

23) 2011arXiv1112.6348S Sigismondi, Costantino, The CLAVIUS Four Centennial Meeting and XXXI ESOP

24) 2011arXiv1112.5878S Sigismondi, Costantino, High precision ground-based measurements of solar diameter in support of Picard mission

25) 2011arXiv1112.5871D d’Avila, Victor; Reis Neto, Eugenio; Coletti, Alissandro; Oliveire, Luis Carlos; Matias, Victor; Humberto Andrei, Alexandre; Lousada Penna, Jucira; Calderari Boscardin, Sergio; Sigismondi, Costantino, A new approach for the heliometric optics

26) 2011arXiv1112.4873S Sigismondi, Costantino, Airborne observation of 2011 Draconids meteor outburst: the Italian mission

27) 2011arXiv1112.2356S Sigismondi, Costantino, Differential photometry of delta Scorpii during 2011 periastron

28) 2011arXiv1112.0403R Raponi, Andrea; Sigismondi, Costantino, Solar Limb Darkening Function from Baily's Beads Observations

29) 2011arXiv1112.0401S Sigismondi, Costantino; Raponi, Andrea; Wang, Xiaofan; De Rosi, Giulia; Bianda, Michele; Ramelli, Renzo, The power spectrum of the seeing during solar observations

IRAP Ph D Erasmus Mundus Students
Baranov Andrey

Position: Ph. D. student (Erasmus Mundus Program), LAPTH, Universite de Savoie, Annecy-le-Vieux, France
Period covered: 09/2010-09/2013

I Scientific Work
In our group under supervision of Prof. Pascal Chardonnet we study evolution and fate of very massive stars. These stars should end their life as pair-instability supernovae, so we perform numerical analysis of pair-instability explosion. The first stars in the Universe, called Population III stars, since they are metal free, should produce pair-instability supernovae with a rate greater than what is observed now. So we also study influence of explosions of massive stars on early Universe.

II Conferences and educational activities
II a Conferences and Other External Scientific Work
IAU Symposium 279 “The Death of Massive Stars”, Nikko, Japan, 12-16 March 2012

13th Marcel-Grossmann meeting, Stockholm, Sweden, 1-7 July 2012

Erasmus Mundus schools in University of Nice
4-8 June, 2012
1-21 September, 2012

2012 List of Publication
Proceedings of the workshop 'From Nuclei to White Dwarfs and Neutron Stars', Les Houches, France, 2011. (sent for publication)
Benedetti Alberto

Position: 3rd year Erasmus Mundus PhD Student
Period covered: September 2010 –

Scientific Work

We studied the entire dynamics of energy conversion from initial overcritical electric field, ending up with thermalized electron-positron-photon plasma. Our approach is based on the kinetic theory which allows to determine the time evolution of each particle distribution function including the effects due to particles interactions. Hence we solved numerically the relativistic Vlasov-Boltzmann equations for electrons, positrons and photons, with collision integrals for 2-particle interactions computed from exact QED matrix elements. The adopted numerical method is characterized by having an adaptive time step which enables us to follow physical processes occurring on very different time-scales. Firstly pair creation occurs from vacuum breakdown and secondly back reaction results in plasma oscillations. Thirdly photons are produced by electron-positron annihilation. Finally particle interactions lead to completely equilibrated thermal electron-positron-photon plasma. This work generalizes some of the results obtained up to now in this field of research. In particular, considering a more general phase space, the conversion of energy into rest mass energy of electron-positron pairs is shown to be less efficient. In fact, most of the initial energy is transformed into thermal energy of particles.

The scheme described above has been generalized and it will be applied to the study of the GRBs photospheric emission. We want to follow the photon, electron and proton distribution functions when the relativistic outflow approaches transparency in order to investigate their effects on the observed spectra.

Conferences and educational activities

- IRAP Ph.D. Erasmus Mundus Workshop, April 5, 2011, Pescara (Italy)
- IRAP Ph.D. Erasmus Mundus Workshop, April 3-8, 2011, Les Houches (France)
- Fermi Symposium, May 9-12, 2011, Rome (Italy)
- Advances in Computational Astrophysics: methods, tools and outcomes, June 13-17, 2011, Cefalù (Italy)
- Italian-Korean Meeting, July 4-9, 2011, Pescara (Italy)
- IRAP Ph.D. Erasmus Mundus School, September 7, 2011, Nice (France)
- IRAP Ph.D. Erasmus Mundus Workshop, October 6, 2011, Les Houches (France)
- Galileo-Xu Guanqui Meeting, October 12, 2011, Beijing (China)

List of Publications

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

- “Phase space evolution of pairs created in strong electric fields”
  A. Benedetti, R. Ruffini, G. V. Vereshchagin, proceedings of the 12th Italian-Korean Meeting to be published by the Italian Physical Society (SIF) in the Volume "Nuovo Cimento C".

- “Phase space evolution of pairs created in strong electric fields"
Fraga de Oliveira Bernardo Machado

Position: PhD Student

I Scientific Work
Work with Prof. Ruffini, Carlos Arguelles and Ivan Siutsou in a unified model for dark matter halos and compact objects in the center of galaxies based on semidegenerate fermions interacting only gravitationally. This model is an alternative to the current paradigm that there is a supermassive black hole in the center of galaxies.
Work with Dr. Paolo Giommi and Bruno Arsioli in identifying blazars in the WISE survey and build a catalog of high synchrotron peaked blazars. Also use the catalog to build a correlation function and check how the Cosmic Background Radiation may be contaminated by these discrete sources.

II Conferences and educational activities
II a Conferences and Other External Scientific Work
Attendance to the 3rd Galileo-Xu Guangqi Meeting, Beijing, China (10/2011).
Oral presentation: Self-Gravitating system of fermions as central objects and dark matter halos in galaxies.

Attendance to the XIII Marcel Grossman Meeting, Stockholm, Sweden (07/2012).

Attendance to the Erasmus Mundus School, Nice, France (09/2012).
Oral presentation: Self-gravitating system of fermions as Dark Matter on galaxies.

Attendance to “Current Issues on Relativistic Astrophysics”, Seoul, South Korea (11/12)
Oral Presentation: Self-gravitating system of fermions as Dark Matter on galaxies.
Gregoris Daniele

Position: Erasmus mundus Ph.D. student (2011-2014)
Host Institution: Stockholm University

**Scientific work:**
I am studying the role of friction forces in several contexts of general relativity under the supervision of Dr. Donato Bini, Dr. Sauro Succi and Prof. Kjell Rosquist. In particular we follow the formalism of Poynting and Robertson analyzing the motion of a test particle inside a photon gas superposed to a Schwarzschild black hole, inside a photon gas in the Tolman metric and inside a massive gas in the Pant-Sah metric respectively. I am also working on a project about inhomogeneous cosmology under the supervision of prof. Kjell Rosquist. We are comparing the curvature of a regular distribution of (5-8-16-24-120-600) Schwarzschild black holes on the 3-sphere with the one of a closed Friedmann model with the same matter content. We are deriving the equations of motion for the 8 masses case from an analytic point of view and discussing the role of discrete symmetries in these models.

**Oral presentations given in international meetings and schools:**
“Boltzmann equations in curved space-time: formulation and applications in General Relativity”, 12th Italian-Korean Symposium on relativistic astrophysics, July 2011
“Friction forces in General Relativity”, Erasmus Mundus school, June 2012
“Friction forces in General Relativity”, MG13, July 2012
“Friction forces”, Erasmus Mundus school, September 2012

**Other schools attended:**
Erasmus Mundus school, September 2011

**Exams that I passed during my Ph.D.:**
Swedish, Course 1 for international students and researchers (4.5 credits)
Cosmology and Astroparticle Physics (7.5 credits)
Path integral methods in QFT (7.5 credits)
Advanced Non-relativistic Quantum Field Theory (7.5 credits)
Mathematical physics (7.5 credits)

**Other academic experiences:**
“Percorso di eccellenza” of the faculty of natural science of “La Sapienza”, academic year 2010-2011
Visiting Ph.D. student at the Albert Einstein Institute in Potsdam (October-November 2012)

**Publications on journals with referees:**

**Proceedings:**

128
Bini, Gregoris, *Kinetic theory in curved space-times: applications to black holes*, proceeding for the 12th Italian-Korean Symposium on relativistic astrophysics

Bini, Gregoris, Rosquist, *Friction forces in general relativity*, submitted as proceeding for the MG13, 2012
Gruber Christine

Position: PhD Student
Period covered: September 2010 - present

I Scientific Work

- Dark energy from vacuum energy contributions of bosonic and fermionic fields in the universe;
- Improvements and extensions of cosmographical analyses of supernova data in order to obtain the parameters of the cosmographic series;
- Bose-Einstein condensation in compact astrophysical objects such as white dwarfs and neutron stars.

II Conferences and educational activities

Conferences and Other External Scientific Work
2012, September 3rd-22nd: “Dark Energy from the Vacuum Energy of Quantum Fields” and “Bose-Einstein Condensation in Astrophysical Compact Objects”, talks at the Erasmus Mundus School, Université de Nice Sophia-Antipolis, Nice, France
2012, August 21st-25th: “Bose-Einstein Condensation in Astrophysical Compact Objects”, poster contribution at the 514th WE-Heraeus Seminar “Quo vadis, BEC?”, Bad Honnef, Germany
2012, July 3rd: “Cosmography and constraints on the equation of state of the Universe in various parameterizations”, talk at 13th Marcel Grossmann Meeting, Stockholm, Sweden
2012, January 2nd: “Dark Energy from the Vacuum Energy of Quantum Fields”, talk at the New Year’s Seminar of AG Kleinert, FU Berlin, Germany
2011, September 5th-17th: “Dark Energy in the Gross-Neveu model”, talk at the Erasmus Mundus Summer School, Université de Nice Sophia-Antipolis, Nice, France

Work With Students
Summer internship RISE (Research Internships in Science and Engineering): supervision of a Bachelor student from Yale University for a summer internship (June – August 2011).

Other Teaching Duties
Free University Berlin:
- Fall term 2010/11: Tutorial for Theoretical Physics III: Electrodynamics
- Fall term 2011/12: Tutorial for Theoretical Physics III: Electrodynamics

2012 List of Publications
Liccardo Vincenzo

Position: PhD Student
Period covered: October 2010- October 2013

I Scientific Work
“The LAUE project for broadband gamma-ray focusing lenses”, laboratory activity devoted to the study of the features of the X-ray facility in Ferrara (LARIX).
“Installations and commissioning at ID20, practical experiences on X-rays related instrumentations”, under the scientific supervision of Roberto Verbeni at the ESRF (Grenoble, France) as Research Fellow.

II Conferences and educational activities

II a Conferences
- Attendance to the “Erasmus Mundus School”, Nice, France, 3rd Sep – 22nd Sep, 2012

2012 List of Publication

Conference Proceedings:


Martins de Carvalho Sheyse

Position: PhD Student
Period covered: 2010-2013

I Scientific Work
The Feynman-Metropolis-Teller (FMT) treatment considering a classic non-relativistic Thomas-Fermi model confined in a Wigner-Seitz cell has been recently generalized to relativistic regimes and applied to the description of non-rotating white-dwarfs in general relativity. We are extending the FMT treatment to the case of finite temperatures for white dwarfs with different nuclear compositions. Our aim is to understand the effects of finite temperatures on the structure of white dwarfs, constructing and analyzing their equation of state and mass-radius relation.

The observation of the late X-ray emission of the Gamma-Ray Bursts (GRBs) associated to Supernova explosions within the so-called GRB-Supernova connection problem has evidenced the possibility of witnessing the thermal evolution of neo-neutron stars: neutron stars just formed in the Supernova event with expected very large temperatures of tens of billion degrees. Therefore, we are exploring the effects of very large temperatures on the equation of state of nuclear matter at high densities important for neutron stars as well as on the different emission mechanisms leading to the cooling of such newly-born neutron stars.

II Conferences and educational activities
II a Conferences and Other External Scientific Work
- Erasmus Mundus School, Nice, France, 5-8 June, 2012.
- Marcel Grossmann meeting, Stockholm, Sweden, 1st - 7th July, 2012
- Current Issues on Relativistic Astrophysics - November 5-6, 2012 - Seoul (South Korea)

2012 List of Publication
- Title: On the Relativistic Feynman-Metropolis-Teller Equation of state at Finite Temperatures and low densities White Dwarfs.

- Title: The Relativistic Feynman-Metropolis-Teller Equation of State at Finite Temperatures.
  Authors: S. Martins de Carvalho, M. Rotondo, J. Rueda and R. Ruffini.
  To submitted to Phys. Rev. C.

- Title: On the Mass-Radius Relation of White Dwarfs at Finite Temperatures within the Relativistic Feynman-Metropolis-Teller Equation of State.
  Authors: S. Martins de Carvalho, J. Rueda and R. Ruffini.
  To submitted to Astronomy & Astrophysics
Strobel Eckhard

Position: PhD Student
Period covered: September 1, 2012 – August 31, 2015

I Scientific Work
Critical and Overcritical Electromagnetic Fields

II Conferences and educational activities
II a Conferences and Other External Scientific Work
Nov 2012  “Current Issues on Relativistic Astrophysics”, Seoul, South Korea
Sep 2012  “IRAP Ph.D. Erasmus Mundus school”, Nice, France
Jul 2012  “13th Marcel Grossmann Meeting”, Stockholm, Sweden

2012 List of Publication
Sversut Arsioli Bruno

Position: PhD IRAP-ErasmusMundus
Period covered: 2012-2014

I Scientific Work
Preparation of an complete catalog of HSP (high spectral peaked blazars) based on Wise all-sky survey.

II Conferences and educational activities
- SIGRAV Graduate School in Contemporary Relativity and Gravitational Physics, Villa Olmo, Como (Italy), 21-26 May, 2012.
- 10th Agile Workshops ASDC, Rome Italy, 18, April, 2012
- Erasmus Mundus School, Nice, France, 5-8 June, 2012.
- Erasmus Mundus School, Nice, France, 3rd – 19th September, 2012. Presentation; Active Galactic Nuclei: Blazars
- Marcel Grossmann meeting, Stockholm, Sweden, 1st – 7th July, 2012

2012 List of Publication
Paper in Preparation: High spectral peaked blazars; Enhanced catalog based on Wise all-sky survey; To be submitted for Astronomy & Astrophysics Journal.
Administrative and Secretarial Staff
Adamo Cristina

E mail address cristina.adamo@icranet.org
Telephone +39 085 23054205
Fax +39 085 4219252
Nationality Italian
Date and place of birth Vibo Valentia, 12 December 1972

Work experiences

Date 09 November 2009 → present
Name of employer ICRANet - International Center for Relativistic Astrophysics Network
Administrative employee
Main activities and responsibilities Administrative office: accountancy, preparing reimbursement and rewards for scientific visitors, online payments, analysis of bank statements.

Date 04 March 2007 → 09 October 2009
Occupation or position held Head Administrative Office

Name and address of employer Solaris Srl - Manoppello (PE) - Industrial Springs Production

Date 01 April 2001 - 28 January 2004
Occupation or position held Responsible for marketing planning
Main activities and responsibilities Evaluation of markets perspective. Coordination and reduction of commercial plans. Survey of the competition sale prices. Coordination of marketing plans and commercial budgets.
Name and address of employer | Merker SpA - Trucks production
---|---
Date | 1997 - 2000
Title of qualification awarded | Trainee at a Business Consultant
Name and address of employer | Consultant office Dott. Vincenzo Micozzi - Pescara
Principal subjects / occupational skills covered | Date 1997 - 31/03/2001
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
Occupation or position held | Stageur
Main activities and responsibilities | Implementation of check systems management
Name and address of employer | Software House Polymatic - Chieti Scalo

**Education and training**

Date | November 1991 - 16 July 1996
Title of qualification awarded | Degree in Economics – Economics of financial middleman

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
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: course in Paris and Lyon. Success on final exams.

Dates 1997 - 1997
Title of qualification awarded Expert in enterprise management
Main Subjects Purchase and logistics, financing, administration and control, marketing, production, budget, bringing out of new products
Name and type of organisation providing education and training Regione Abruzzo - CIFAP

Dates 1997 - 1997
Title of qualification awarded Evaluator of Quality systems
Main subjects Expert according to the ISO regulations. Qualification for leading controls according to the UNI EN 9002 regulations.

Personal skills and competences
Mother tongue Italian
English Indipendent User
French Basic User

Social skills and competences Communication Ability acquired during the working experiences
Aptitude to learn, adaptable to new situations, different from the known ones.
Ability to work under pressure.
Good aptitude to work in multicultural environment thanks to the experiences spent abroad for education or personal reasons.
Team spirit

Organisational skills and competences Innate sense of organisation both in the working place and in the management of personal and familiar life.
I am considered as a reference point by the production operators.
<table>
<thead>
<tr>
<th>Technical skills and competences</th>
<th>Mastery in quality control processes in small enterprises (I was responsible for the quality evaluation)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Computer skills and competences</td>
<td>Good Knowledge of Microsoft Office (Word, Excel e PowerPoint)</td>
</tr>
<tr>
<td></td>
<td>Very good knowledge of Team System – Gamma, Mult program</td>
</tr>
<tr>
<td></td>
<td>Basic knowledge of graphic application</td>
</tr>
<tr>
<td></td>
<td>Good knowledge of Internet and web search engines.</td>
</tr>
</tbody>
</table>
Barbaro Pina

Université de Nice Sophia Antipolis, EDSFA, Ecole Doctorale
Parc Valrose - 28 Av. Valrose
06108 Nice Cedex 2 FRANCE
+33-4-92 07 63 91
Pina.Barbaro@unice.fr

Work experiences
02.11.2010 Introduction in the third functional F1 area: Administrative and Consular Officer
15.11.2006 Introduction in the C Functional Area, qualification: Administrative, Consular and Social Adjunct officer
16.05.2001 Introduction in the Functional B3 area, qualification: Administrative collaborator
01.02.1983 Introduction in the Foreign Ministry, qualification: B2 Administrative Assistant

Service in Italy
04.09.2007 Press and information service
01.02.2002 General Direction of the Staff
01.09.1995 General Direction Political Affairs
01.02.1983 General Direction Cultural Affairs

Service abroad
From 2008 Nice – Detached at the International Organization ICRANet
From 2002 to 2007 Nice – Italian General Consulate
From 1990 to 1995 Bruxelles – Permanent Italian Representative at the Atlhantic Council

Missions abroad
In the course of 2002 Alessandria d’Egitto – Italian General Consulate
In the course of 1997 New York – Permanent Italian Representative at the United Nations
In the course of 1990 New York – Permanent Italian Representative at the United Nations
In the course of 1986 – 1988 e 1989 Bruxelles – Permanent Italian Representative at the Atlhantic Council

Education and competences
15.03.1985 Degree in Political Sciences – University of Rome “La Sapienza”

Languages:
French Excellent
English Good
Spanish Elementary

Computer Skills
Word – Excel - Internet
**Del Beato Annapia**

P.zza della Repubblica 10
I-65122 Pescara (Italy)
+39 085 2305426
+39 085 4219252
annapia.delbeato@icranet.org

**Work experiences**

<table>
<thead>
<tr>
<th>Dates</th>
<th>Occupation or position held</th>
<th>Main activities and responsibilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>02/2008 - present</td>
<td>Responsible for the Documentation Center of ICRANet</td>
<td>meeting planning (before and during the event)</td>
</tr>
<tr>
<td></td>
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<td>proceedings publication</td>
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<td>websites contents</td>
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<td>public relations (press contact, submission of conference announcements,</td>
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<tr>
<td></td>
<td></td>
<td>contacts with researchers and students, etc...)</td>
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<tr>
<td></td>
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<td>collection and cataloguing of scientific publications</td>
</tr>
<tr>
<td></td>
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<td>management of the library</td>
</tr>
<tr>
<td></td>
<td>ICRANet</td>
<td>P.zza della Repubblica 10</td>
</tr>
<tr>
<td></td>
<td>Address P.zza della Repubblica 10</td>
<td>I-65122 Pescara (Italy)</td>
</tr>
</tbody>
</table>

<table>
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<tr>
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<th>Main activities and responsibilities</th>
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<tbody>
<tr>
<td>13/06/2007 - 31/12/2007</td>
<td>Employee at the Information Point of the Azienda Speciale &quot;D. Ferrigno&quot;</td>
<td>Responsible for the external relations of the Azienda Speciale Deborah Ferrigno of the Municipality of Montesilvano in the information point called “Sportello Sociale”.</td>
</tr>
<tr>
<td></td>
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<td>Name and address of employer Azienda Speciale “D. Ferrigno” - Municipality of Montesilvano</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Address Palazzo Baldoni -P.zza I. Montanelli</td>
</tr>
<tr>
<td></td>
<td></td>
<td>I-65016 Montesilvano (Italy)</td>
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</table>

<table>
<thead>
<tr>
<th>Dates</th>
<th>Occupation or position held</th>
<th>Main activities and responsibilities</th>
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</thead>
<tbody>
<tr>
<td>04/06/2007 - 31/01/2008</td>
<td>English teacher</td>
<td>English Teaching in a Training Course at the Engineering Office “Studio Proima s.r.l.”</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Name and address of employer Studio Proima srl</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Address C.so Umberto I</td>
</tr>
<tr>
<td></td>
<td></td>
<td>I-65016 Montesilvano (Italy)</td>
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</table>

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<tbody>
<tr>
<td>15/02/2007 - 31/05/2007</td>
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</tbody>
</table>
Occupation or position held: English Teacher
Main activities and responsibilities: English teaching in courses organized by Centro Studi Stoa in the following public schools: I° Circolo “Ravizza” Chieti, Istituto comprensivo S. Giovanni Teatino (via Di Nisio, via Mazzini, via V.Emanuele)

Name and address of employer: Centro Studi Stoa
Address: V. San Paolo 2
I-65016 Montesilvano (Italy)

Dates: 09/04/2006 - 31/12/2006

Occupation or position held: Employee at EURODESK
Main activities and responsibilities: Employed at Azienda Speciale “D. Ferrigno” of the Municipality of Montesilvano for the opening of a EURODESK. A particular attention was given to the social integration and assistance, as well as to the activities aiming at making easier the access and the fruition of the municipal facilities to disadvantage and needy subjects

Name and address of employer: Azienda Speciale “D. Ferrigno” - Municipality of Montesilvano
Address: P.zza I. Montanelli
I-65016 Montesilvano (Italy)


Occupation or position held: English teacher
Main activities and responsibilities: English Teaching in the Project “Comunicare in Europa POR – Asse C – Misura 2 Az. 3” funded by CEE, realised by Liceo Scientifico C. D’Ascanio in Montesilvano in collaboration with Regione Abruzzo

Name and address of employer: Liceo Scientifico “C. D’Ascanio”
Address: V. Verrotti
I-65016 Montesilvano (Italy)

Dates: 01/2005

Occupation or position held: Hostess at a Communication Agency
Main activities and responsibilities: reception and registration assistance during the conferences

Name and address of employer: Virgola Comunicazione
Address: V. R. Sanzio
I-65122 Pescara (Italy)

Education and training

Dates: 02/2006 - 12/2006
Title of qualification awarded: I° level Master “How to teach English”
Principal subjects / occupational skills covered: English and German linguistics psycholinguistic sociolinguistic
didactics
computer skills
240 training hours as English teacher at Liceo Scientifico C. D’Ascanio Montesilvano.

Name and type of organisation providing education and training
Università degli Studi “G. D’Annunzio”
Address V. dei Vestini, 66100 Chieti (Italy)

Dates 09/2003 - 03/2004
Title of qualification awarded Erasmus EU-funded Scholarship
Principal subjects / occupational skills covered Courses on: English Literature, American Literature, History and Marketing.

Name and type of organisation providing education and training
University of Warwick (UK)
Address Coventry (United Kingdom)

Dates 07/2005
Title of qualification awarded Degree in Foreign Languages and Literature (courses on Tourist Management) with final mark: 110 cum laude.
Principal subjects / occupational skills covered Courses on:
- English and French language
- English and French literature
- American Literature
- Italian Literature
- Touristic Management
- Economics
- Marketing
- Didactics
- Linguistics
- Final Thesis on American Literature, title: “Charles W. Chesnutt: The Marrow of Tradition”

Name and type of organisation providing education and training
Università degli Studi “G. D’annunzio”
Address V.le Pindaro, 65124 Pescara (Italy)

Dates Summer 1998 and 2000
Title of qualification awarded Summer School Camps in UK
Principal subjects / occupational skills covered Courses on English language

Name and type of organisation providing education and training
Westminster College - Oxford (United Kingdom) and Roehampton College - Putney, London (United Kingdom)

Dates 06/2000
<table>
<thead>
<tr>
<th><strong>Title of qualification awarded</strong></th>
<th>High School Degree at Liceo Socio-Psico-Pedagogico with final mark: 100/100.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Principal subjects / occupational skills covered</strong></td>
<td>Psychology</td>
</tr>
<tr>
<td></td>
<td>Sociology</td>
</tr>
<tr>
<td></td>
<td>Pedagogy</td>
</tr>
<tr>
<td></td>
<td>Linguistics</td>
</tr>
<tr>
<td><strong>Name and type of organisation providing education and training</strong></td>
<td>Istituto “B. Spaventa”</td>
</tr>
<tr>
<td><strong>Address</strong></td>
<td>Città S. Angelo (Italy)</td>
</tr>
</tbody>
</table>

**Personal skills and competences**

- **Mother tongue**: Italian
- **Other language(s)**: English, French
- **Social skills and competences**: reliable, well-organized, punctual and accurate, able to work in stressful situations, adaptable to work in new situations, able to work in team, helpful
- **Computer skills and competences**: ECDL (European Computer Driving Licence)
  - Microsoft Office (Word, Excel, Powerpoint, Access, Publisher, Outlook)
- **Driving licence(s)**: B
NAME  FEDERICA DI BERARDINO
PHONE  0039-085-23054200
FAX  0039-085-4219252
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;

May 2004
Translations from/to English;

March 2004
Work for Ajilon Agency, Pescara, for distribution of books in the local schools;

2001-2004
Interviews for Customer Satisfaction, for “NETWORK Research Institute S.r.l.” at Iper - Città Sant’Angelo;

2001-2003
Researcher for “Informazione e servizi senza barriere”(Agency: NETWORK S.r.l.);

1998-2000

EDUCATION
June 2004
Foreign Language and Literature College degree, 110/110 cum laudem, at University G. D’annunzio (Pescara). Final thesis on Spanish and Economic -Tourism Geography: “Problemi, tendenze e prospettive...
dello sviluppo socio-economico in Spagna. Casi di studio” (Supervisor: Prof. G. Massimi);

January 2004

- Researches in Spain for graduation thesis and improvement of Spanish knowledge.

September-December 2002

- “Nazareth College”, Rochester, N.Y. (U.S.A.) Four months classes and final exams on English, Marketing and Spanish.

1998

- High School degree at Foreign Languages High School “G. Marconi”, Pescara.

October 1996

- English classes at “Irondequoit High-School” in Rochester (N.Y.)


- Multiple visits to England to attend English colleges for training courses;
- Visits to the USA (N.Y. e Massachusetts) to improve oral skills for American-English.

SOCIAL-CULTURAL EXPERIENCES

January-March 2005: Trip to Vanuatu (Melanesian archipelago, old “New Hebrides”) for humanitarian aid experience. Voluntary work in a few islands of the archipelago and elementary learning of local language, the Bislama.

PERSONAL SKILLS

Main studies and job experiences focused on foreign cultures and languages. University degree on Spanish and English. Daily practice with both languages through conversation and readings.

The work experience in touristic exhibition and in the “in store promotion” field, in addition to the experience as entertainment organizer, helped to develop interpersonal abilities.

MOTHER-TONGUE

ITALIAN

OTHER LANGUAGES
ENGLISH, SPANISH, FRENCH

RELATIONAL ABILITIES

Team work experience, mainly in multi-cultural contexts.

The two main training experiences in the US high school and later in college supported the personal and professional growth, helped to acquire an open-minded attitude towards other cultures, which are essential for cooperation and mutual respect.

The work as customer service assistant, hostess and sales promoter have been relevant in acquiring professional skills in the relationship with customers: importance of communication, which is the ability to listen to and to be listened.

Development of a positive attitude towards any kind of problematic situation; problem-solving skills and working method based on the achievement of goals.

ORGANIZING COMPETENCES

Organizing ability mainly acquired through team work in summer camps for kids and teen-agers, where showing a coordinating attitude in the group.

In the same work field has been developed the spirit of adaptability, in addition to the creativity (namely invention of new games and artistic creation for entertainment).

Open and charismatic personality, flexible, active, dynamic, loving challenges.
Professionalism based on accuracy, punctuality and strong attitude to work towards goals.

**TECHNICAL SKILLS**

- Daily use of personal computer at work: 80% of the work is based on the use of PC.

**ARTISTIC SKILLS**

- Photography: First-level class and Advanced class Diplomas.
- Dance: Jazz Dance, Flamenco, Traditional Dances, Artistic Gym.
- Piano and guitar classes.
- Great passion for music (jazz, acoustic, ethnic, rock and classic), theatre and readings.
- Free time: travels, photography and museums.

**DRIVING LICENCE**

- Driving license cat. B
Latorre Silvia

PERSONAL INFORMATION
Place and date of birth Chieti, 23/09/1982
Nationality Italian
E-mail silvia.latorre@icranet.org
Phone 085 - 23054223
Fax 085 - 4219252

WORK EXPERIENCES

- Date 12/02/2008 - present
  - Name of employer ICRANet
  - Firm or Sector International Center for Relativistic Astrophysics Network
  - Kind of Employment Administrative employee
  - Main Tasks Managing the relationship with suppliers, controlling invoices, calculating reimbursement and rewards for our scientific visitors, preparing orders for the bank, executing and verifying on-line payments, meeting our bank referents for particular payment operations, cash holding, using ICRANet cost-accounting system.

- Date 01/12/2006 – 20/01/2008
  - Name of employer DelVerde Industrie Alimentari S.p.A.
  - Firm or Sector Pasta Factory
  - Kind of Employment Trainee
  - Main Tasks Study and analysis of annual financial statements of ten competitor pasta factories for the financial years from 2002 to 2006, as well as reclassification of balance sheets and profit and loss accounts and calculation of the main income and financial indexes. Analysis of export strategies of DelVerde and other Italian pasta factories.

EDUCATION

  - 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
  - Mark 106/110
• Date 09/1996 – 07/2001
• Institution Secondary School focusing on sciences- Liceo Ginnasio Statale “Publio Virgilio Marone” Vico del Gargano (FG)
• Main Subjects Mathematics analysis, Italian language and literature, Latin language and literature, Chemistry, Physics
• Achieved Qualification Scientific school-leaving certificate
• Mark 100/100

FOREIGN LANGUAGES

ITALIAN

MOTHER-TONGUE

ENGLISH (GOOD) – FRENCH (ELEMENTARY)

OTHER LANGUAGES

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

Very good use of Internet and e-mail accounts.
Good use of cost-accounting system HELPASI and bank system BNL Businessway.
Elementary knowledge of HTML e CSS programs for websites. Knowledge of “TOP VALUE” program for financial diagnosis and corporate planning.

ARTISTIC SKILLS

Piano classes attended for 8 years. sol-fa Diploma.

DRIVING LICENCE

Driving licence cat. B

FURTHER INFORMATION

I like reading, writing, travelling, going to the cinema, listening music, playing the piano. I have a determined, dynamic and flexible personality. I like staying and working with people.