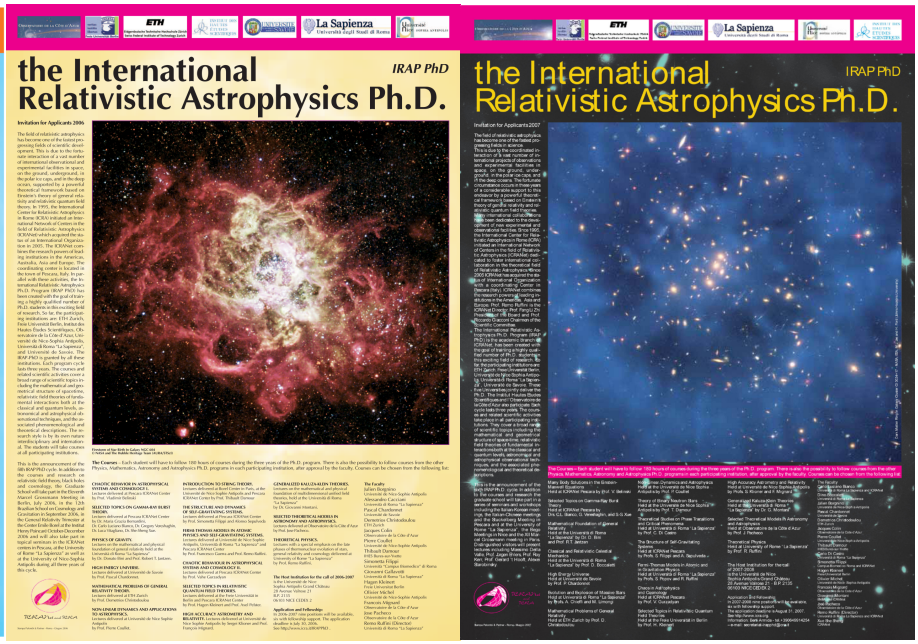
Enclosure 6

the International
Relativistic Astrophysics Ph.D.
IRAP PhD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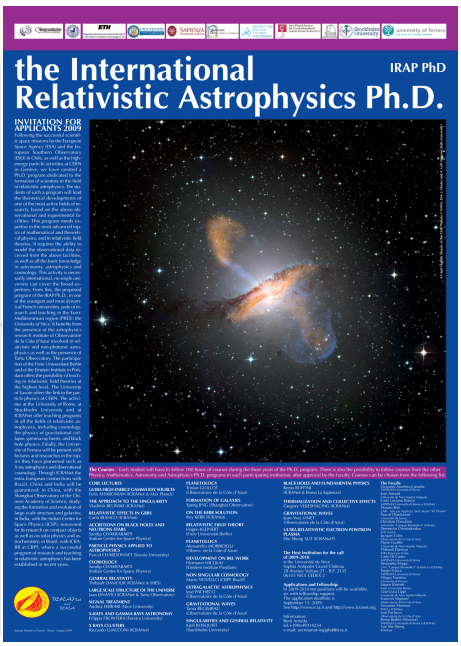
the International
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INVITATION FOR
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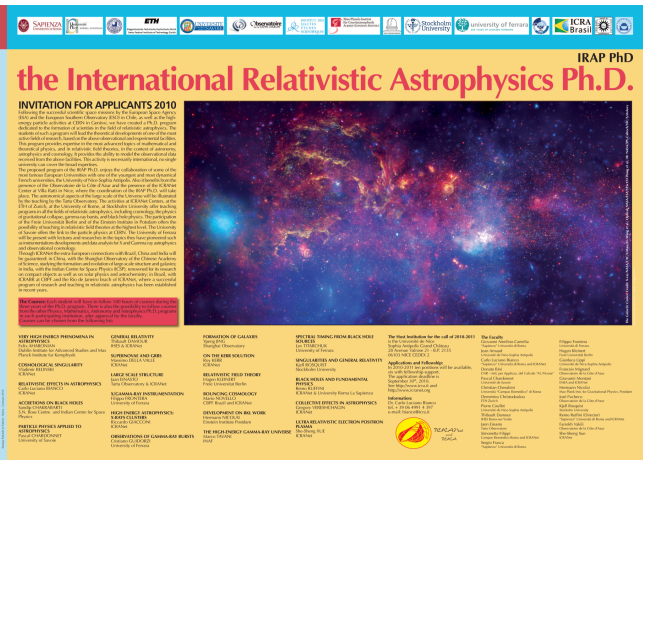
the International Relativistic Astrophysics Ph.D.
Erasmus Mundus Joint Doctorate Program
IRAP PhD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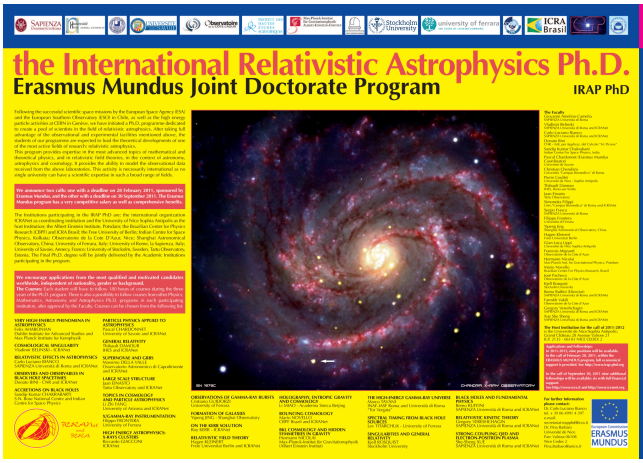
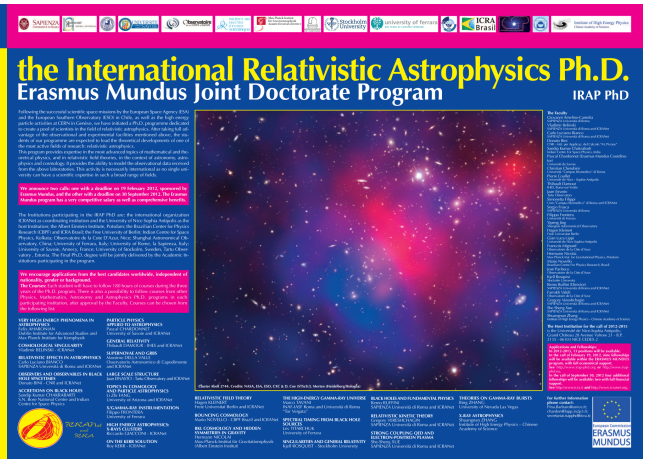




the International Relativistic Astrophysics Ph.D.

Joint Doctorate Program sponsored by Erasmus Mundus, CAPES and ICRANet

IRAP PhD

Following the successful scientific space missions by the European Space Agency (ESA) and the European Southern Observatory (ESO) in Chile, as well as the high energy particle activities at CERN in Genève, we have initiated a Ph.D. programme dedicated to create a pool of scientists in the field of relativistic astrophysics. After taking full advantage of the observational and experimental facilities mentioned above, the students of our programme are expected to lead the theoretical developments of one of the most active fields of research: relativistic astrophysics.

This program provides expertise in the most advanced topics of mathematical and theoretical physics, and in relativistic field theories, in the context of astronomy, astrophysics and cosmology. It provides the ability to analyse and model the observational data received from the above laboratories. This activity is necessarily international as no single university can have a scientific expertise in such a broad range of fields.

At ICRANet-Rio the ICRANet Brazilian Science Data Centre (BSDC) has been started in 2012 and will be fully developed in 2013, bringing a novel multiwavelength data facility from the X-ray and γ-ray telescopes all the way to the other bands and astroparticle domain. All this will be in line with the paradigms of the Virtual Observatory. The expertise of the BSDC will be available to all the students and the scientists of the program.

We announce different calls: one with a deadline on 16 February 2013, sponsored by Erasmus Mundus (an additional one with a deadline on 30 June 2013 sponsored by CAPES, reserved to Brazilian students) and a last one with a deadline on 30 September 2013. The Erasmus Mundus program has a very competitive salary as well as comprehensive benefits.

The Institutions participating in the IRAP PhD are: the international organization ICRANet as coordinating institution and the University of Nice Sophia Antipolis as the host Institution; the Albert Einstein Institute, Potsdam; the Brazilian Center for Physics Research (CBPF) and ICRA Brazil; the Free University of Berlin; Indian Centre for Space Physics, Kolkata; Observatoire de la Cote D'Azur, Nice; Shanghai Astronomical Observatory, China; University of Ferrara, Italy; University of Rome, La Sapienza, Italy; University of Savoie, Annecy, France; University of Stockolm, Sweden, Tartu Observatory , Estonia. The Final Ph.D. degree will be jointly delivered by the Academic Institutions participating in the program.

We encourage applications from the best candidates worldwide, independent of nationality, gender or background.

The Courses: Each student will have to follow 180 hours of courses during the three years of the Ph.D. program. There is also a possibility to follow courses from other Physics, Mathematics, Astronomy and Astrophysics Ph.D. programs in each participating institution, after approval by the Faculty. Courses can be chosen from the following list:

COSMOLOGY WITH GAMMA RAY BURSTS
Lorenzo AMATI - INAF-IASF Bologna

VERY HIGH ENERGY PHENOMENA IN ASTROPHYSICS
Felix AHARONIAN - Dublin Institute for Advanced Studies and Max Planck Institute for Kernphysik

COSMOLOGICAL SINGULARITY
Vladimir BELINSKI
SAPIENZA Università di Roma and ICRANet

RELATIVISTIC EFFECTS IN ASTROPHYSICS
Carlo Luciano BIANCO
SAPIENZA Università di Roma and ICRANet

OBSERVERS AND OBSERVABLES IN BLACK HOLE SPACETIMES
Donato BINI - CNR and ICRANet

FEYNMAN DIAGRAMS IN RELATIVISTIC QUANTUM FIELD THEORIES
Johannes BLUEMLEIN
DESY and Freie Universitat Berlin

ACCRETIONS ON BLACK HOLES
Sandip Kumar CHAKRABARTI
S.N. Bose National Centre and Indian Centre for Space Physics

PARTICLE PHYSICS APPLIED TO ASTROPHYSICS
Pascal CHARDONNET
University of Savoie and ICRANet

GENERAL RELATIVITY
Thibault DAMOUR - IHES and ICRANet

SUPERNOVAE AND GRBS
Massimo DELLA VALLE - Osservatorio Astronomico di Capodimonte and ICRANet

LARGE SCALE STRUCTURE
Jaan EINASTO- TartuObservatory and ICRANet

X/GAMMA-RAY INSTRUMENTATION
Filippo FRONTERA - University of Ferrara

MULTIWAVELENGTH DATA ANALYSIS IN ASTROPHYSICS
Paolo GIOMMI – ASI

ON THE KERR SOLUTION
Roy KERR - ICRANet

RELATIVISTIC QUANTUM FIELD THEORY
Hagen KLEINERT
Freie Universitat Berlin and ICRANet

BOUNCING COSMOLOGY
Mario NOVELLO - CBPF Brazil and ICRANet

BKL COSMOLOGY AND HIDDEN SYMMETRIES IN GRAVITY
Hermann NICOLAI - Max-Planck-Institut für Gravitationsphysik (Albert Einstein Institut)

TIMING ANALYSIS TECHNIQUES OF ASTROPHYSICAL DATA
Mauro ORLANDINI - University of Ferrara

GRB THEORIES
Tsvi PIRAN - Hebrew University Jerusalem

SINGULARITIES AND GENERAL RELATIVITY
Kjell ROSQUIST - Stockholm University

STRONG COUPLING QED AND ELECTRON-POSITRON PLASMA
She-Sheng XUE - SAPIENZA Università di Roma and ICRANet

BLACK HOLES AND FUNDAMENTAL PHYSICS
Remo RUFFINI
SAPIENZA Università di Roma and ICRANet

PHOTOSPHERIC EMISSION IN GRBs
Felix RYDE – Stockholm University

SOLAR ASTROMETRY
Costantino SIGISMONDI - Observatorio Nacional, Rio de Janeiro and ICRANet

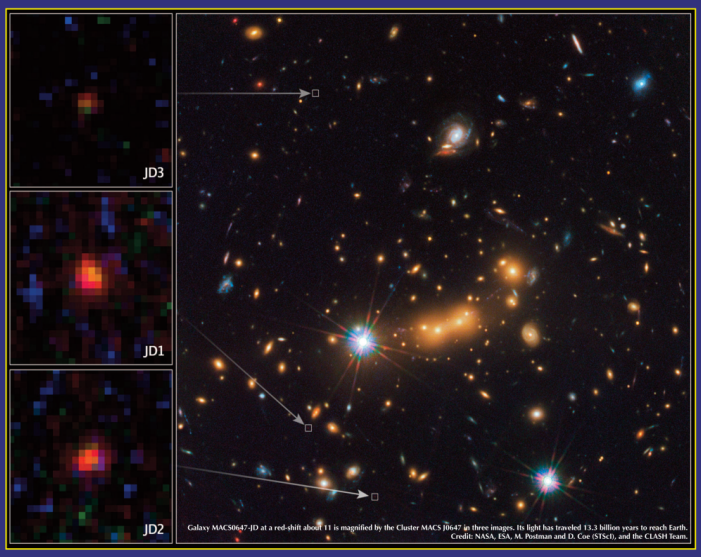
THE HIGH-ENERGY GAMMA-RAY UNIVERSE
Marco TAVANI - INAF-IASF Roma and Università di Roma "Tor Vergata"

BLACK HOLE AND NEUTRONS STARS: OBSERVATIONS VS. THEORY
Leo TITARCHUK – University of Ferrara

RELATIVISTIC KINETIC THEORY
Gregory VERESHCHAGIN
SAPIENZA Università di Roma and ICRANet

THEORIES ON GAMMA-RAY BURSTS
Bing ZHANG - University of Nevada Las Vegas

X-RAY ASTROPHYSICS
Shuangnan ZHANG - Institute of High Energy Physics – Chinese Academy of Science



Galaxy MACS0647-JD at a red-shift about 11 is magnified by the Cluster MACS J0647 in three images. Its light has traveled 13.3 billion years to reach Earth.
Credit: NASA, ESA, M. Postman and D. Coe (STScI), and the CLASH Team.

The Faculty
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SAPIENZA Università di Roma
Vladimir Belinski
SAPIENZA Università di Roma and ICRANet
Carlo Luciano Bianco
SAPIENZA Università di Roma and ICRANet
Donato Bini
CNR – Istituto per Applicaz. del Calcolo "M. Picone"
Sandip Kumar Chakrabarti
Indian Centre For Space Physics, India
Pascal Chardonnet (Erasmus Mundus Coordinator)
Université de Savoie
Christian Cherubini
Università "Campus Biomedico" di Roma
Thibault Damour
IHES, Bures-sur-Yvette
Jaan Einasto
Tartu Observatory
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Shanghai Astronomical Observatory
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Freie Universitat Berlin
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Hermann Nicolai
Max Planck Inst. for Gravitational Physics, Potsdam
Mario Novello
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Ecole Doctorale Nice
Kjell Rosquist
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She-Sheng Xue
SAPIENZA Università di Roma and ICRANet
Shuangnan Zhang
Institute of High Energy Physics – Chinese Academy of Science

The Host Institution for the call of 2013-2016 is the Université de Nice-Sophia Antipolis, Grand Château 28 Avenue Valrose 21 – B.P. 2135 - 06103 NICE CEDEX 2

Applications and Fellowships:
In the call of February, 16th, 2013, nine fellowships will be available within the Erasmus Mundus Program, with full economical support. See http://www.icranet.org/irap-phd or http://www.irap-phd.eu. In the additional call of June 30th 2013, ten additional fellowships will be available for Brazilian students within the CAPES-ICRANet agreement. In the call of September 30, 2013 four additional fellowships will be available: two with full financial support. See http://www.icranet.org/irap-phd.

For further Information please contact:
secretariat-irapphd@icra.it