



IRAP PhD

the International Relativistic Astrophysics Ph.D.

INVITATION FOR APPLICANTS 2010

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 created a Ph.D. program dedicated to the formation of scientists in the field of relativistic astrophysics. The students of such a program will lead the theoretical developments of one of the most active fields of research, based on the above observational and experimental facilities. 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 model the observational data received from the above facilities. This activity is necessarily international, no single university can cover the broad expertise.

The proposed program of the IRAP Ph.D. enjoys the collaboration of some of the most famous European Universities with one of the youngest and most dynamical French universities, the University of Nice-Sophia Antipolis. Also it benefits from the presence of the Observatoire de la Côte d'Azur and the presence of the ICRANet Center at Villa Ratti in Nice, where the coordination of the IRAP Ph.D. will take place. The astronomical aspects of the large scale of the Universe will be illustrated by the teaching by the Tartu Observatory. The activities at ICRANet Centers, at the ETH of Zurich, at the University of Rome, at Stockholm University offer teaching programs in all the fields of relativistic astrophysics, including cosmology, the physics of gravitational collapse, gamma-ray bursts, and black hole physics. The participation of the Freie Universität Berlin and of the Einstein Institute in Potsdam offers the possibility of teaching in relativistic field theories at the highest level. The University of Savoie offers the link to the particle physics at CERN. The University of Ferrara will be present with lectures and researches in the topics they have pioneered such as instrumentations developments and data analysis for X and Gamma ray astrophysics and observational cosmology.

Through ICRANet the extra-European connections with Brazil, China and India will be guaranteed: in China, with the Shanghai Observatory of the Chinese Academy of Science, studying the formation and evolution of large-scale structure and galaxies; in India, with the Indian Centre for Space Physics (ICSP), renowned for its research on compact objects as well as on solar physics and astrochemistry; in Brazil, with ICRABR at CBPF and the Rio de Janeiro branch of ICRANet, where a successful program of research and teaching in relativistic astrophysics has been established in recent years.

The Courses: Each student will have to follow 180 hours of courses during the three years of the Ph.D. program. There is also the possibility to follow courses from the 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:



The Galactic Center Credit: X-ray: NASA/CXC/UMass/D. Wang et al.; Optical: NASA/ESA/STScI/D. Wang et al.; IR: NASA/JPL-Caltech/SSC/S. Stolovy
Stampa Palombi & Partner - Roma - Maggio 2010

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

COSMOLOGICAL SINGULARITY
Vladimir BELINSKI
ICRANet

RELATIVISTIC EFFECTS IN ASTROPHYSICS
Carlo Luciano BIANCO
ICRANet

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

PARTICLE PHYSICS APPLIED TO ASTROPHYSICS
Pascal CHARDONNET
University of Savoie

GENERAL RELATIVITY
Thibault DAMOUR
IHES & ICRANet

SUPERNOVAE AND GRBS
Massimo DELLA VALLE
ICRANet

LARGE SCALE STRUCTURE
Jaan EINASTO
Tartu Observatory & ICRANet

X/GAMMA-RAY INSTRUMENTATION
Filippo FRONTERA
University of Ferrara

HIGH ENERGY ASTROPHYSICS: X-RAYS CLUSTERS
Riccardo GIACCONI
ICRANet

OBSERVATIONS OF GAMMA-RAY BURSTS
Cristiano GUIDORZI
University of Ferrara

FORMATION OF GALAXIES
Ypeng JING
Shanghai Observatory

ON THE KERR SOLUTION
Roy KERR
ICRANet

RELATIVISTIC FIELD THEORY
Hagen KLEINERT
Freie Universität Berlin

BOUNCING COSMOLOGY
Mario NOVELLO
CBPF Brazil and ICRANet

DEVELOPMENT ON BKL WORK X-RAYS CLUSTERS
Hermann NICOLAI
Einstein Institute Potsdam

THE HIGH-ENERGY GAMMA-RAY UNIVERSE
Marco TAVANI
INAF

SPECTRAL TIMING FROM BLACK HOLE SOURCES
Lev TITARCHUK
University of Ferrara

SINGULARITIES AND GENERAL RELATIVITY
Kjell ROSQUIST
Stockholm University

BLACK HOLES AND FUNDAMENTAL PHYSICS
Remo RUFFINI
ICRANet & University Roma La Sapienza

COLLECTIVE EFFECTS IN ASTROPHYSICS
Gregory VERESHCHAGIN
ICRANet

ULTRA RELATIVISTIC ELECTRON POSITRON PLASMA
She-Sheng XUE
ICRANet

The Host Institution for the call of 2010-2011 is the Université de Nice Sophia Antipolis Grand Château 28 Avenue Valrose 21 - B.P. 2135 06103 NICE CEDEX 2

Applications and Fellowship: In 2010-2011 ten positions will be available, six with fellowship support. The application deadline is September 30th, 2010. See <http://www.icra.it> and <http://www.icranet.org>

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"Sapienza" Università di Roma
Jean Arnaud
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Carlo Luciano Bianco
"Sapienza" Università di Roma and ICRANet
Donato Bini
CNR - Istit. per Applicaz. del Calcolo "M. Picone"
Pascal Chardonnet
Université de Savoie
Christian Cherubini
Università "Campus Biomedico" di Roma
Demetrios Christodoulou
ETH Zurich
Pierre Coulet
Université de Nice-Sophia Antipolis
Thibault Damour
IHES Bures-sur-Yvette
Jann Einasto
Tartu Observatory
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