the International Relativistic Astrophysics Ph.D.

Invitation for Applicants 2006

The field of relativistic astrophysics has become one of the fastest progressing fields of scientific development. This is due to the fortunate interaction of a vast number of international observational and experimental facilities in space, on the ground, underground, in the polar ice caps, and in the deep ocean, supported by a powerful theoretical framework based on Einstein's theory of general relativity and relativistic quantum field theory. In 1995, the International Center for Relativistic Astrophysics in Rome (ICRA) initiated an International Network of Centers in the field of Relativistic Astrophysics (ICRANet) which acquired the status of an International Organization in 2003. The ICRANet combines the research powers of leading institutions in the Americas, Australia, Asia and Europe. The coordinating center is located in the town of Pescara, Italy. In parallel with these activities, the International Relativistic Astrophysics Ph.D. Program (IRAP PhD) has been created with the goal of training a highly qualified number of Ph.D. students in this exciting field of research. So far, the participating institutions are: ETH Zurich, Free Universität Berlin, Institut des Hautes Études Scientifiques, Observatoire de la Côte d’Azur, Université de Nice-Sophia Antipolis, Università di Roma “La Sapienza”, and Università di Savole. The IRAP PhD is granted by all these institutions. Each program cycle lasts three years. The courses and related scientific activities cover a broad range of scientific topics including the mathematical and geometrical structure of spacetime, relativistic field theories of fundamental interactions both at the classical and quantum levels, astronomical and astrophysical observational techniques, and the associated phenomenological and theoretical descriptions. The search style is by its own nature interdisciplinary and international. The students will take courses at all participating institutions.

This is the announcement of the fifth IRAP PhD cycle. In addition to the courses and research on relativistic field theory, black holes and cosmology, the Graduate School will take part in the Eleventh Marcel Grossmann Meeting in Berlin, July 2006, in the 12th Brazilian School on Cosmology and Gravitation in September 2006, in the General Relativity Symposium at the Center Emile Borel at the Institut Henri Poincaré October-December 2006, and will also take part in topical seminars in the ICRANet centers in Pescara, at the University of Nice Sophia Antipolis as well as at the University of Nice Sophia Antipolis during all three years of this cycle.

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 IRAP PhD cycles. Applications to each participating institution, after approval by the faculty. Courses can be chosen from the following list:

CHAOTIC BEHAVIOR IN ASTROPHYSICAL SYSTEMS AND COSMOLOGY I. Lectures delivered at Pescara ICRANet Center by Prof. Vladimir Belinskii

SELECTED TOPICS ON GAMMA-RAY BURST THEORY. Lectures delivered at Pescara ICRANet Center by Dr. Maria Grazia Bernardini, Dr. Carlo Lucarelli Bianco. Dr. Gregory Vosheghapin, Dr. Luisa Vitagliano, Dr. Shu-Sheng Xue.

PHYSICS OF GRAVITY. Lectures on the mathematical and physical foundation of general relativity held at the Università di Roma “La Sapienza” by Dr. Davide Ring and Prof. Robert T. Jantzen.

HIGH ENERGY UNIVERSE. Lectures delivered at Università di Savole by Prof. Pascal Chauvinot.

MATHEMATICAL PROBLEMS OF GENERAL RELATIVITY THEORY. Lectures delivered at ETH Zurich by Prof. Domenico Christodoulo.

NON-LINEAR DYNAMICS AND APPLICATIONS TO ASTROPHYSICS. Lectures delivered at Università di Nice Sophia Antipolis by Prof. Pierre Couture.

INTRODUCTION TO STRING THEORY. Lectures delivered at Breda Center in Paris, at the Università di Nice Sophia Antipolis and Pescara ICRANet Center by Prof. Thibault Damour.

THE STRUCTURE AND DYNAMICS OF SELF-GRAVITATING SYSTEMS. Lectures delivered at Pescara ICRANet Center by Prof. Simonetta Filippi and Alonso Sepulveda.

FERMI-THOMAS MODELS IN ATOMIC PHYSICS AND SELF-GRAVITATING SYSTEMS. Lectures delivered at Università di Nice Sophia Antipolis, Università di Roma “La Sapienza” and Pescara ICRANet Center by Prof. Francesco Guarrera and Prof. Romeo Ruffini.

CHAOTIC BEHAVIOUR IN ASTROPHYSICAL SYSTEMS AND COSMOLOGY II. Lectures delivered at Pescara ICRANet Center by Prof. Vake Gurzadyan.

GENERALIZED CAULIA-KLEIN THEORIES. Lectures on the mathematical and physical foundation of multifield unified field theories, held at the Università di Roma “La Sapienza” by Dr. Giovanni Mignard.

SELECTED THEORETICAL MODELS IN ASTRONOMY AND ASTROPHYSICS. Lectures delivered at Observatoire de la Côte d’Azur by Prof. Jose Picard.

THEORETICAL PHYSICS. Lectures with a special emphasis on the late phases of thermonuclear evolution of stars, general relativity and cosmology delivered at Università di Roma “La Sapienza” by Prof. Romeo Ruffini.

The Host Institution for the call of 2006-2007 is the Università di Nice Sophia Antipolis Grand Château 29 Avenue Valrose 21 B.P. 2135 06103 NICE CEDEX 2

Application and Fellowship. In 2006-2007 nine positions will be available, six with fellowship support. The application deadlines is July 30, 2006. See http://www.ira.icraphd.it/