



## **Preface: Recent Developments on Physics in Strong Gravitational Fields**

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## PREFACE TO THE VOLUME: PHYSICS IN STRONG GRAVITATIONAL FIELDS

The V LEOPOLDO GARCÍA–COLÍN MEXICAN MEETING ON MATHEMATICAL AND EXPERIMENTAL PHYSICS was held at EL COLEGIO NACIONAL in Mexico City, Mexico, from September 9<sup>th</sup> to 13<sup>th</sup>, 2013, to set up a forum for promising and important areas of research in Physics. The response of the community was altogether enthusiastic with over 600 participants and around one hundred speakers from all over the world.

In addition to the five plenary lectures of the Meeting, each parallel symposium consisted of invited talks divided in 10 main one hour talks and 21 half hour talks. The overall impact of the event was more than satisfactory.

Our main objective continues with the philosophy adopted in the four previous events in 2001, 2004, 2007, and 2010, namely, to provide a scenario to Mexican promising graduate students and young Mexican researchers on frontier topics in both mathematical and experimental physics, in order to keep them in contact with developments taking place in other parts of the world and at the same time, to motivate and support the younger generations of researchers in our country.

This is the reason behind inviting as lectures some of the most distinguished experts in the subjects of the conference. We hope that we will be able to continue celebrating this international gathering endeavour every three years, in particular the Sixth edition of the Meeting in 2016.

The Proceedings of this V Meeting consist of three volumes: i) Physics in strong gravitational fields, ii) Transport Theory, and iii) Plasma Physics.

This was the first time that the meeting is held without our teacher, adviser, and friend Don Leopoldo García-Colín, member of El Colegio Nacional, who recently passed away. With these volumes we want to express our respect, admiration, and affection to him. We want to recognise his scientific and scholarly achievements, the inspirational quality of his teaching, his graciousness as a colleague, his thoughtful guidance of graduated students, his service to the department, the university and the physics community at large, his open, courteous, easy accessibility to anyone needing his counsel or expertise. *We dedicate this volume to the memory of Leopoldo García-Colín.*

For his outstanding contributions to the field of *Confrontation of Gravitational Physics with Experiments*, Prof. Claus Lämmerzahl, from the Center of Applied Space Technology and Microgravity (ZARM) of the Bremen University, was awarded the Leopoldo García-Colín Medal series 2013.

This volume of the Proceedings contains lecture notes on the topics covered during the *Symposium on Physics in Strong Gravitational Fields*. The contributions cover two invited plenary talks, as well as the invited symposium talks. Plenary talks provided a pleasant and efficient way to learn about the present status of the more relevant topics of current research. In addition, symposium talks gave us the opportunity to acquire an idea of more specialised research works presented by world's leading experts in their areas, and at the same time they facilitated the communication with and among them.

We would like to express our gratitude to everyone who contributed to the success of the Symposium on Physics in Strong Gravitational Fields. Very special thanks are due to the invited speakers and lecturers, national and foreigners, who addressed a very interesting and high quality set of talks, and shared their deep knowledge and time with participants. The impact of their contribution among our scientific public was outstanding.

We want to thank Prof. Luis Felipe Rodríguez and Prof. Eusebio Juaristi, both members of El Colegio Nacional, for their support, which was very important to have once again this magnificent venue, this time for the fifth edition of the conference. We also want to thank the crew of El Colegio Nacional for their help with the organization of the logistic of the event and for their warm hospitality, which was extended to all participants, and also for the impeccable logistic that prevailed during the event.

We also acknowledge the very important support of the Universidad Autónoma Metropolitana (UAM), in particular we thank Dr. Enrique Fernández Fassnacht, former president of our University, and Dr. Salvador Vega y León current president of the UAM, for their enthusiastic support and understanding and for allowing us to continue with this endeavour which became already a tradition. Without their support the whole meeting and in particular the Symposium on Physics in Strong Gravitational Fields could not be held.

Additional thanks are given to The National Council for Science and Technology (CONACyT), in particular we thank Dr. Luis Mier y Terán, for sponsoring our meeting. At the same time, we thank The Institute of Science and Technology of the Mexico City government, in particular to Dr. Julio Mendoza, also for financial support.

We thank Dr. José Antonio de los Reyes, Dean at UAM–Iztapalapa Campus of the Faculty of Basic Sciences and Engineering, for sponsoring this international and multidisciplinary endeavour.

We thank the German academic exchange service (DAAD) as well for support. Financial support from Iberoamerican University is acknowledged too.

We are specially grateful to María Eugenia López-Solache, Administrative Assistant attached to the Physics Department of the Universidad Autónoma Metropolitana and Guadalupe Neri, secretary of our group for Gravitation and Cosmology, for their invaluable help and support.

We hope that these Proceedings will serve to foster the impressive growth of Cosmology and Relativity in the region, and additionally to reinforce the already existing strong ties between Mexican scientists and their colleagues in other parts of the world.

Alfredo Macías and Marco Maceda