

## PREFACE

During August/September 2007, a group of 102 physicists from 62 laboratories in 20 countries met in Erice to participate in the 45<sup>th</sup> Course of the International School of Subnuclear Physics. The countries represented by the participants were: Belarus, China, Colombia, Estonia, France, Germany, Hungary, India, Italy, Japan, Mexico, Netherlands, New Zealand, Norway, Poland, Portugal, Romania, Russia, Slovenia, South Africa, Switzerland, Ukraine, United Kingdom and the United States of America.

The School was sponsored by the Academies of Sciences of Estonia, Georgia, Lithuania, Russia and Ukraine; the Chinese Academy of Sciences; the Commission of the European Communities; the European Physical Society; the Italian Ministry of Education, University and Scientific Research; the Sicilian Regional Government; the Weizmann Institute of Science; the World Federation of Scientists and the World Laboratory.

The School's purpose was to give an overview of the present status of Subnuclear Physics with focus on the intense theoretical activity that characterizes the field, while waiting for the first LHC results. During the course, the most recent developments in theories beyond the Standard Model, in particular Supergravity, String Theories and Extra-Dimension Theories, were discussed. Emphasis was also given to novel QCD phenomena, to flavour and neutrino Physics, and to the most outstanding problems in Cosmology and their connection to Particle Physics. Finally, experimental highlights from the most relevant sources of new data were presented, including the latest news concerning future facilities.

An original feature of the School, introduced in 1996, is a series of special sessions devoted to "New Talents", with the aim of encouraging and promoting young physicists to achieve recognition at an international level. This is a serious problem in Experimental Physics, where collaborations count several hundreds of participants and it is almost impossible for young fellows to make themselves known. Although with much less emphasis, the problem exists also in Theoretical Physics. So we decided to offer 35 young fellows the possibility to give an open presentation of the results of their studies, followed by a discussion.

Among them, 12 best “New Talents” have been selected for publication in this volume, and were given an award.

During the organization and the running of this year’s Course, I enjoyed the collaboration of my colleague and friend, Gerardus ’t Hooft, who shared with me the Directorship of the Course. I would like to thank him, together with the group of invited scientists and all the people who contributed to the success of this year’s Course.

I hope the reader will enjoy the book as much as the students attending the lectures and the discussion sessions, which, as every year, have been the focal point of this School’s activity. Thanks to the work of the Scientific Secretaries, the discussions have been reproduced as faithfully as possible. At various stages of my work I have enjoyed the collaboration of many friends whose contributions have been extremely important for the School and are highly appreciated. I thank them most warmly. A final acknowledgement to all those in Erice, Bologna and Geneva, who have helped me on so many occasions and to whom I feel very indebted.

Antonino Zichichi  
Geneva, October 2007