

PREFACE

During August/September 2006, a group of 96 physicists from 57 laboratories in 18 countries met in Erice to participate in the 44th Course of the International School of Subnuclear Physics. The countries represented by the participants were: Belgium, Brazil, Canada, France, Germany, Greece, Hungary, India, Israel, Italy, Japan, the Netherlands, Poland, Romania, Russia, Spain, 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.

Each lecture of the School was dedicated to the memory of Richard H. Dalitz. The School's purpose was to focus attention on the phenomenological and theoretical developments in Gauge Theories, as well as in global and local Supersymmetry, including all the other sectors of Subnuclear Physics. Moreover, special emphasis was given to investigate if and how Complexity could shed new light in the greatest achievement of Reductionism, i.e. the Standard Model and its extension which predicts GUT, the existence of the Superworld and the resolution of the quantum-gravity problem via the powerful theoretical structure of Relativistic Quantum String Theory. Finally, experimental highlights from the most relevant sources of new data were presented and discussed, 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 be known. Even if with much less emphasis, the problem exists also in Theoretical Physics. So we decided to offer 25 young fellows the possibility to give an open presentation of the results of their studies, followed by a discussion. Among them, 15 best "New Talents" have been selected for publication in this volume,

and five were given an award. In particular, one award for an original work in theoretical physics, one for valuable work in experimental physics, one for an original work in data analysis, one for the best theoretical presentation and one for the best experimental presentation were assigned.

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 the 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 2006