

PREFACE

The Nuclear Physics Schools organized by the Institute of Physics and Nuclear Engineering are well known to physicists around the world due to their long history and good reputation. The first edition took place in Bucharest in 1964 and after a five-year break the series continued regularly every second year in Predeal. For some administrative reasons, in 1978, the location of the school was changed from Predeal to Poiana Braşov. In 1991, however, we moved it back to Predeal and that happened since our desire was to restore the good tradition and also to recover the excellent conditions we had before.

This edition is organized by the University of Bucharest in collaboration with the Institute of Physics and Nuclear Engineering. The efforts were shared by the two important institutions mainly because some of the people from the Organizing Committee moved to the University, aiming at having closer contacts with the students.

The school from this year was devoted to the study of nuclear structure and dynamics of nuclear systems and their constituents. As shown in the table of contents, the chosen subjects cover a large area of modern nuclear physics. Various phases of nuclear matter at low and intermediate energies were explored. Nuclear structure subjects were always a central issue of nuclear physics. In our school some hot subjects like critical points in nuclear shape phase transitions, octupole deformed nuclei, approaches going beyond the mean-field approximation, nuclear molecules, exotic nuclei and neutron stars, synthesis of super-heavy elements, relativistic covariant descriptions, received the deserved attention. Various features of multifragmentation processes were interpreted both in statistical and dynamical models. Also the particle production processes in heavy ion collisions are investigated. Two extensive lectures on dark matter and various scenarios for its detection were delivered. A possible link to certain mechanisms for neutrinoless double beta decay was discussed. A QCD self-consistent description for dilepton production was presented. Recent results for the proton structure investigated by (e, e') experiments at HERA were presented. The team of speakers was constituted from distinguished professors from different important corners of the world. They presented, with high competence, the most recent results in their fields and sketched appealing perspectives.

I am happy to mention that the scientific climate was very good and that the lectures stimulated an active participation of the audience.

I hope that the near future will positively evaluate the benefit provided by the present school to participants. Having in mind the hot discussions of the participants during the lectures, the large volume of exchanged scientific information, the established new collaborations, the common research plans sketched for the near future, we may assert that the main scope of the present school has been accomplished. The young physicists listened outstanding professors speaking about their results as well as about the open problems in their fields and due to these facts they returned to their home institutes with an increased optimism.

In order to allow the young physicists, who were not able to attend the school, to have access to the scientific information transferred there, I tried my best to make the proceedings ready for publication, in a reasonably short time. Indeed, by now the proceedings of invited lectures are available, being published by World Scientific. To complete the job we prepared this issue of the Romanian Journal of Physics, where all short communications are included. Since the main aim of the school is the training of the young students, we wanted to deliver a few reviews on some subjects which, due to the lack of time, were not adequately covered. Therefore we invited some of the speakers to write an extensive review on their preferred subject.

I hope that the present volume will be very useful to a large category of nuclear physicists. Also, I am convinced that the scientific level of the lectures, the academic atmosphere and the beauty of the mountains surrounding the place are three decisive attractors for participants to the next edition.

Before closing, I would like to mention that the first summer school on nuclear physics in Romania was organized by Prof. Aureliu Sandulescu. He organized many editions of this school and influenced a lot, by his enthusiasm, the development of the field of Nuclear Physics in Romania. His merits as a great scientist, his human qualities are worldwide recognized. Since I had the privilege of being his first PhD student, and benefited of his support in many occasions, I prepared these proceedings in honor of Acad. Prof. Dr. Aureliu Sandulescu on his 75th anniversary. This is an homage for his contribution to science as well as for starting to build up a school in the field of Theoretical Nuclear Physics. Many Happy Returns of the Day!

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