

Preface

The present 33rd volume of the *Nuclear Theory* series contains articles based on the presentations given at the Thirty Third International Workshop on Nuclear Theory (IWNT-33) held from 22nd to 28th of June 2014 in the Rila Mountains, Bulgaria. The Workshop is annually organized by the Nuclear Theory Laboratory (NTL) of the Institute for Nuclear Research and Nuclear Energy (INRNE) of the Bulgarian Academy of Sciences (BAS) since 1980. The Organizing Committee with the help of the Advisory Committee and the members of the Laboratory make continuous efforts to enlarge the scientific field covered by the Workshop, as well as, to widen the number of participants by inviting colleagues with different interests in the areas of nuclear physics and the related topics. Our aim is to sustain the interest of the participants in the contemporary developments and problems in the fundamental theory and experiment in nuclear physics study, as well as, in applications which are of utmost importance for the whole society.

The main topics of the 2014 Workshop

- nuclear structure and reactions;
- symmetries and dynamics;
- collective and intrinsic motions of nuclei;
- exotic nuclei;
- few-body and many-fermion systems;
- nuclear astrophysics and related topics

are part of the NTL's program for basic nuclear physics research. This broad range of subjects gives a space for the participants to cover the most actual points of view relating the theory with experiment, providing interpretation and predictions, bridging interdisciplinary topics related to nuclear structure and reactions. A very positive new development in the last few years is the inclusion in the Workshops program of nuclear physics applications, such as nuclear safety, presented this year by two young participants from the Kozloduy Nuclear Power Plant.

The Workshop was attended by 42 participants (including the organizers) from 19 scientific institutions of 11 countries: Armenia, Romania, Italy, India, South Africa, Russia, Uzbekistan, Poland, Hungary, USA, UK, Slovakia, France and Spain. The scientific program contained totally 30 oral talks and 4 posters.

Some of the collaborations established between NTL members and colleagues from various international institutions like INFN (Pavia), the Institute of Nuclear Research, (MTA Atomki, Hungary) and the University of Surrey (UK) were represented at the Workshop. Also, the Workshop attracted a number of first-time coming visitors, which has open a promising possibility for the establishment of future new collaborations.

The Workshop proved once more time itself as a fruitful ground for exchanging ideas not only between nuclear physics scientists from different fields and in-

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stitutions, but also between the experienced scientists and the new coming generation of young physicists. During IWNT-33 a number of young scientists and students were introduced to real scientific activities including the newest trends in the experimental and theoretical nuclear physics as well as in the prospective related fields of research providing them a variety of ideas for possible career development. At this workshop we also remembered our late colleagues Prof. Peter Raychev and Prof. Tzanka Venkova, both of them remaining an indispensable part of our community and the spirit of the Workshop.

The beautiful mountain nature, the good weather and the friendly atmosphere at the workshop provided a nice opportunity for direct communication between participants. We were able to realize our full social program with a number of excursions and informal events such as climbing the top of Malyovitza. We had a number of pleasant self-entertainment events during the official diner with special poetry contributions (included in the book). The later proves that we, the physicists, are not only hard working, serious scientists, but also people enjoying the arts and music. From the number of participants' letters received after the workshop we were happy to understand that our guests had taken home nice memories from Bulgaria and the Workshop. Therefore, we hope that all of them will be happy to come again.

The Workshop was organized and the proceedings are published with the partial financial support of the Bulgarian National Science Fund under contract No. DID-02/16-2009 and from the Kozloduy Nuclear Power Plant. A number of international contracts and agreements of NTL members have also provided a valuable support for the organization of the Workshop. With this support we were able to help the participation of a number of international young and first-time visitors, as well as of our retired colleagues – prominent specialists in the subject of the Workshop.

The editors of the volume would like to express their gratitude to our colleagues from the Organizing Committee, Mitko Gaidarov, Dimitre Kadrev, Plamen Yotov and Kalin Drumev, as well as to all members of the of Nuclear Theory Laboratory for their help and invariable support during the organization of the Workshop. We are also grateful to the members of the International Advisory Committee for the valuable suggestions and ideas about the organization of the Workshop.

Finally, we would like to thank all the participants of IWNT-33 for their contribution to the nice scientific atmosphere as well as to the participants who contributed to the present volume. We hope that the scientific level and the quality of the papers included prove the vitality and the future perspectives of the nuclear physics and its related areas.

The next 34th issue of the International Workshop on Nuclear Theory will be held in the Rila Mountains, Bulgaria from 21st to 27th of June 2015.

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Sofia, November 2014