PREFACE to
the Proceedings of the International Workshop “Shapes and Dynamics of Atomic Nuclei: Contemporary Aspects” (SDANCA-19), 3-5 October 2019, Sofia, Bulgaria

This volume contains articles based on the presentations given at the International Workshop “Shapes and Dynamics of Atomic Nuclei: Contemporary Aspects” (SDANCA-19) held in the Hotel of the Bulgarian Academy of Sciences (BAS) in Sofia from 3th to 5th of October 2019. The Workshop was organized by researchers from the Institute of Nuclear Research and Nuclear Energy (INRNE) in BAS with the financial support of the Bulgarian National Science Fund under contracts No. KP-06-N28/6 and KP-06-RILA/6. It appears as the third issue of the workshop SDANCA-15 and SDANCA-17 held in the same place in 2015 and 2017.

The aim of the Workshop was to collect highly motivated researchers in the field of nuclear shape dynamics and related phenomena providing a possibility to discuss advanced ideas, open problems and future directions for developments in the subject. It was expected to outline points of common interest and inspire new ideas in the various contemporary aspects of the theoretical and experimental approaches to the shape-dynamics problem in atomic nuclei and other physical systems. We believe this meeting contributed for the strengthening of the existing collaborations as well as for attracting newly interested colleagues to the scientific community formed around the topic.

The SDANCA-19 Workshop covered the following main topics:

- Collective and microscopic models for nuclear deformations;
- Shapes and symmetries – geometric and algebraic aspects;
- Shape coexistence and shape-phase transition phenomena;
- Complex shapes, isomers and cluster phenomena;
- Shapes and dynamics at the limits of stability;
- New data on nuclear deformations and advanced experimental techniques;
- Interdisciplinary aspects: shape phenomena in other physical systems.

The Workshop was attended by 47 registered participants from 17 countries: Austria, Canada, China, Finland, France, Germany, Greece, India, Israel, Hungary, Poland, Romania, Russia, Spain, United Kingdom, United States and Bulgaria. Additionally not-registered colleagues from INRNE and University of Sofia were also interested and have attended the presentations. The scientific
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program contained in total 34 talks and six 30 minutes discussions led by conveners. Similarly to SDANCA-15 and SDANCA-17, the discussions appeared to be really inspiring with many additional questions being raised and disputed. The talks and the discussions covered issues of microscopic and collective approaches and new experimental results as well, including: density and covariant-density functional theory, many-body/self-consistent theories, shell-model-based and ab-initio developments, group-theoretical (algebraic) models exploring different kinds of symmetries (unitary, symplectic, “proxy”, etc.) associated with the most actual effects of shape coexistence, shape-phase transitions, shell effects, pairing and multipole interactions, geometric models treating softness, triaxiality and wobbling, chirality, rod-shape, pear-shape and dinuclear system effects, Hoyle states, nuclear isomers, new experimental data and techniques for lifetimes, moments and mass measurements, laser spectroscopy as well as intriguing interdisciplinary developments on nuclear astrophysics, nuclear clock elaboration and many related applications. Further details about SDANCA-19, including the list of all participants and downloadable files of presentations (in pdf or ppt format) provided by some speakers, can be found in the Workshop web site: http://ntl.inrne.bas.bg/events/sdanca19/.

The editor of the volume would like to thank colleagues who were involved in the organization of the SDANCA-19 Workshop: Neli Stoilova, Martin Ivanov, Orlin Yordanov and Kalin Drumev for their work in the Organizing Committee as well as Lili Atanasova for her help during the workshop. Thanks to all colleagues from the International Program Committee for their help at different stages of organization and arrangement of the scientific program. I would like to express my special gratitude to Dennis Bonatsos, Phil Walker and Peter Ring for their continuous moral support before, during and after the Workshop.

Finally, I would like to express my thanks to all the participants of SDANCA-19 for their contribution to the inspiring scientific atmosphere, to all the authors who contributed to the present volume, as well as to all the referees who provided timely comments on the contributions making it possible to publish the volume within this year. The feedback received from many participants during and after the workshop as well as the referees’ reports unambiguously point to the high scientific level of the presentations given and the high quality of the papers included in this volume. This result will keep the SDANCA Workshop organizers inspired and may encourage them to continue this series of workshops in the future.

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