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Restoration of Broken Symmetries in the Nuclear Many-Body Problem

Guest Editors:

Prof. Dr. Javid Sheikh
Department of Physics, University of Kashmir, Srinagar 190006, India

Prof. Dr. Peter Ring
Department of Physics, Technische Universität München, D-85747 Garching, Germany

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Message from the Guest Editors

Mean-field models have played a pivotal role in elucidating the fascinating properties of the nuclear many-body system. The mean-field wavefunction incorporates the important many-body correlations by spontaneously breaking the symmetries obeyed by the Hamiltonian of the system. The restoration of these symmetries is essential for evaluating the observable quantities which can then be compared with the experimental data. Although symmetry projection methods have been known for more than fifty years, but the application of these methods to realistic Hamiltonians and model spaces poses several challenges. The primary objective of the present special edition is to deliberate on these impediments and to provide a possible roadmap for the resolution of these problems. The special edition will also invite proposals on the application of symmetry restoration methods to unbound systems where coupling between discrete and continuum spaces becomes essential.

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Editor-in-Chief

Prof. Dr. Sergei Odintsov
1. Institució Catalana de Recerca i Estudis Avançats (ICREA), Passeig Luis Companys, 23, 08010 Barcelona, Spain
2. Institute of Space Sciences (ICE-CSIC), C. Can Magrans s/n, 08193 Barcelona, Spain

Message from the Editor-in-Chief

Symmetry is ultimately the most important concept in natural sciences. It is not surprising then that very basic and fundamental research achievements are related to symmetry. For instance, the Nobel Prize in Physics 1979 (Glashow, Salam, Weinberg) was received for a unified symmetry description of electromagnetic and weak interactions, while the Nobel Prize in Physics 2008 (Nambu, Kobayashi, Maskawa) was received for the discovery of the mechanism of spontaneous breaking of symmetry, including CP symmetry. Our journal is named *Symmetry* and it manifests its fundamental role in nature.

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Contact Us

Symmetry Editorial Office
MDPI, Grosspeteranlage 5
4052 Basel, Switzerland

Tel: +41 61 683 77 34
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mdpi.com/journal/symmetry
symmetry@mdpi.com
𝕏@Symmetry_MDPI