Special Issue

Nuclear Physics and Symmetry/Asymmetry: Advances and Prospects

Message from the Guest Editor

Symmetry principles have long underpinned breakthroughs in nuclear physics, from Weyl's foundational work to modern applications in nuclear structure, reactions, and thermodynamics. This Special Issue explores both **symmetry-driven frameworks** and emerging **asymmetry phenomena** that challenge established models. We highlight advances in algebraic approaches, cluster dynamics, and symmetry restoration in many-body methods, alongside novel studies of **charge, parity, and isospin asymmetries** in exotic nuclei and dense matter. The Special Issue also addresses **experimental signatures of symmetry breaking**, such as collective motion anomalies, phase transitions, and neutrinoless double-beta decay. Submissions on ab initio symmetry-adapted techniques, symmetry in nuclear astrophysics, and applications to quark–gluon systems are encouraged. Our dual focus aims to bridge theoretical rigor with observable asymmetries, fostering discussions on unresolved challenges—from chiral restoration in QCD to topological phases in nuclei. We welcome perspectives on future directions, including machine learning-enhanced symmetry analysis and interdisciplinary links to particle and condensed matter physics.

Guest Editor

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About the Journal

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.

Editor-in-Chief

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