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Symmetry and Quantum Orders

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Message from the Guest Editor

Dear Colleagues,

The classification of phases of matter and the transitions between them is the main pursuit of condensed matter physics. Symmetry has traditionally been the central idea to introduce order into the enormous complexity of the quantum many-body problem governing the behavior of matter. Through much of the 20th century, the Landau paradigm of broken symmetry shaped our understanding of how to classify phases of matter and how to characterize the critical phenomena that separate them. In recent years, many exciting developments have deepened our understanding of new invariants that, in part, depend on the presence of symmetry but do not rely on the breaking of it, thereby separating (quantum) phases of matter with identical symmetry groups. Concurrent developments have emphasized the need for higher form symmetries, describing conservation laws for extended objects, to accomplish a more complete understanding of all possible quantum phases of matter. The present Special Issue is broadly dedicated to the role of symmetry in constraining and shaping the possible equilibrium and non-equilibrium behaviors of quantum matter...

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Special Issue

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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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