

Special Issue

Symmetry in Ultracold Gases and Superfluidity

Message from the Guest Editors

This Special issue of *Symmetry* seeks to explore new frontiers in ultracold atoms. This Special Issue will particularly focus on investigating novel quantum phases and quantum phase transitions in ultracold atomic quantum matter and its applications to quantum information and metrology. Recently, systems of bosonic or fermionic quantum gases allow for a very high level of experimental control concerning all ingredients of the underlying many-body Hamiltonian. Therefore, ultracold atomic or molecular quantum gases are considered to be ideal quantum simulators, that is, they are best capable to simulate difficult problems in quantum many-body physics. Contributions are invited for cutting-edge researches that simulate many known condensed matter phenomena such as superfluid-insulator transition, BEC-BCS crossover, as well as reveal many completely new physics, like discrete time-crystal, many-body localization and etc. This Special issue will be tied closely to the latest developments in this direction and to address major challenges as well as to discuss new directions. The aim of the present Special issue is to exchange ideas and boost new approaches, techniques, and perspectives.

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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.

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