Special Issue

Applications Based on Symmetry/Asymmetry in Quantum Mechanics

Message from the Guest Editor

- Symmetry and asymmetry are crucial in quantum mechanics, as they define the properties and behaviors of quantum systems in a variety of physical domains. Symmetry plays a critical role in fields such as quantum control, quantum information, quantum sensing, quantum theory and quantum thermodynamics. Moreover, symmetry-protected topological phases and symmetry-breaking transitions are vital in understanding complex quantum phenomena. In fact, symmetry operations can provide insights into quantum coherence, entanglement, and quantum phase transitions. On the contrary, asymmetry often leads to interesting new effects, such as non-reciprocal transport, directional energy flow and increased sensitivity in quantum metrology. Symmetry can also be utilized in quantum optics, which is used to design photonic circuits.
- This Special Issue, entitled “Applications Based on Symmetry/Asymmetry in Quantum Mechanics”, welcomes contributions that present theoretical advances, practical experiments, and computational techniques related to symmetry and asymmetry in quantum systems.

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.

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