Special Issue

Symmetry and Asymmetry in Quantum Mechanics

Message from the Guest Editor

Symmetries are significant links in any physical discipline. Their observation and quantitative description provide the key to understanding the manifestation of a physical phenomenon. It follows from the theorem proved by Emmy Noether, which connects each continuous symmetry of a physical system with some conservation law (for example, if processes in an isolated system of particles are invariant to the time shift, then the law of energy conservation is fulfilled in this system). Groups of translations, rotations, reflections such as U(1), O(3) SU(2), SU(3), and others have a crucial place in the problems of quantum mechanics, be it the internal organization of particles, their interaction, or their behavior in any external field. Additionally, one can remark on the CPT theorem (charge, parity, and time reversal symmetry) proving a strict correspondence between matter and antimatter... From the other side, symmetry breaking induced by decoherence processes due to thermodynamic reasons causes the asymmetry of time.

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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