Special Issue

Vortex, Topology and Singularity in Quantum Systems

Message from the Guest Editor

Symmetry is closely related to the topological structure of a physical system. A non-trivial topology of a quantum system may originate from a singularity that exists in the system. Singularity is universally present in the natural world at all levels. Singularities exist as a topological defect, classical vortex, quantum vortex, or topological structure such as a skyrmion. A singularity causes a topological effect, and universal physics appears from it. We expect that new and universal physics will emerge from the study of quantum singularity. It is important, in order to understand nature, to clarify the properties and dynamics of phenomena that are caused by the presence of singularities. This Special Issue of *Symmetry* is devoted to theories and experiments that reveal or predict new phenomena emerging from quantum structures such as vortices and skyrmions in physical systems. Special emphasis is put on novel phenomena and the dynamics of quantum vortex states in classical and quantum systems and topological structures with non-zero quantum numbers such as skyrmion. Prof. Dr. Takashi Yanagisawa

Guest Editor

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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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