Special Issue

Symmetry and Lie Algebras

Message from the Guest Editors

Symmetry is a fundamental concept in physics and mathematics, representing invariance under certain transformations. A Lie algebra is an algebraic structure defined on a vector space through a binary operation called the Lie bracket, satisfying certain properties. Symmetry and Lie algebras are deeply connected: every continuous symmetry of a physical system is associated with a Lie algebra. This association is established through the concept of infinitesimal transformations, which are small, local changes that preserve the symmetry of a system. Lie algebras provide a way to represent these infinitesimal transformations. Each element of the Lie algebra corresponds to a generator of a symmetry transformation. Lie algebras offer a rich and versatile mathematical framework with applications across a wide range of scientific disciplines. Their ability to capture the symmetries of systems makes them an indispensable tool for both theoretical and applied research.

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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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