

Special Issue

Symmetry in Physics: From Conservation to Violation

Message from the Guest Editors

Symmetry in physics stands as a foundational principle that underpins our understanding of the universe's fundamental laws. It manifests in various forms, from the elegant symmetries of classical mechanics through those encountered in quantum field theory. Symmetry principles dictate the conservation of fundamental quantities such as energy, momentum, and angular momentum, providing remarkable insights into the dynamics of physical systems. However, the universe also reveals instances where symmetry is violated, challenging our conventional understanding. Lorentz violation, for instance, suggests deviations from the symmetry of spacetime under Lorentz transformations, potentially signaling new physics beyond the standard model. Similarly, in particle physics, the violation of charge–parity (CP) symmetry has profound implications for understanding the asymmetry between matter and antimatter in the cosmos. These violations prompt physicists to explore new theoretical frameworks and experimental frontiers, enriching our comprehension of the universe's intricacies and pushing the boundaries of knowledge in the quest for a more comprehensive theory of nature.

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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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