

Special Issue

Symmetry and Asymmetry in Plasma and High Energy Physics

Message from the Guest Editors

Symmetry and asymmetry play a central role in modern plasma and high-energy physics. Symmetry principles guide fundamental interactions, conservation laws, and the mathematical structures of physical theories. Conversely, asymmetries—whether spontaneous, dynamic, or due to explicit symmetry breaking—often reveal deeper physical laws and new phenomena. In plasma physics, symmetries and their violations affect transport, stability, turbulence, and collective behavior in both astrophysical and laboratory plasmas. In high-energy physics, the Standard Model is built upon fundamental symmetries, while effects such as CP violation, chiral asymmetry, and dynamical symmetry breaking suggest physics beyond the Standard Model. This Special Issue gathers research on symmetry and asymmetry across plasma and high-energy physics, including theoretical and experimental work on plasma instabilities, nonlinear dynamics, particle interactions, symmetry violations, and effective field theories. We especially encourage studies on how asymmetries arise and lead to observable consequences, as well as contributions using AI or machine learning.

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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.

Editor-in-Chief

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