Special Issue

Symmetry and Supernova Neutrinos in Astroparticle Physics

Message from the Guest Editor

In astroparticle physics, the investigation of symmetry and supernova neutrinos is integral to comprehending the fundamental processes governing the universe. Symmetry in particle physics pertains to invariances in physical laws under specific transformations, providing a framework for classifying elementary particles and predicting their interactions. Within the context of supernovae, symmetry principles are critical for accurately modeling the dynamics of core collapse and the subsequent supernova explosion, which emits an enormous flux of neutrinos. Neutrinos, which are nearly massless and interact only weakly with matter, are produced in vast quantities during the core-collapse phase of supernova. These elusive particles facilitate energy and information transport from the supernova, yielding insights into the mechanisms underlying these cataclysmic phenomena. The detection and analysis of supernova neutrinos can enhance our understanding of neutrino properties, including mass and oscillation phenomena, closely linked to the underlying symmetries in the Standard Model of particle physics.

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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