Special Issue

Neutrinos and Symmetry: Theoretical Developments and New Directions

Message from the Guest Editors

Neutrinos are special particles in many ways: on the one hand, their masses are orders of magnitude lighter than all other fermions, and on the other hand, their mixing matrix is substantially different from that measured in the quark sector. While measurements of their fundamental properties, like mass-squared differences and mixing angles, have recently reached remarkable experimental precision, the theoretical understanding of such values remains a deep mystery. Several efforts in the past have been devoted to searching for extensions of the Standard Model (SM) based on additional gauge and/or family symmetries that are able to explain neutrinos' properties at the fundamental level. In this volume, we want to offer an exhaustive overview of the proposed beyond-the-SM theories to accommodate neutrino masses and mixing and a panorama of the most recent research activity in the field. **Keywords**

- neutrino masses
- neutrino mixing
- symmetries
- new physics
- model building

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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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