Special Issue

Majorana Neutrinos and Matter-Antimatter Asymmetry: Status and Prospects of Double Beta Decay Search in Experiment and in Theory

Message from the Guest Editor

This Special Issue aims to present recent and possible future developments in the study and searches of double beta decay. Double beta decay is an established second-order process in the standard model (SM) of electroweak interaction, in which two electrons and two anti-neutrinos are emitted simultaneously in a nucleus. If the neutrinos are Majorana particles, a second double beta decay mode becomes possible, where a nucleus can decay to its daughter by emitting just two electrons without anti-neutrinos, hence the name neutrinoless double beta decay (0□□□). The observation of 0□□□ would demonstrate the Majorana nature of neutrinos, and provides possible explanations for the asymmetry of matter and antimatter in the universe. Many experiments have searched for the 0□□□ processes employing various isotopes, including Ge-76, Te-130, and Xe-136. The constraints on the half-lives of these isotopes are in the order of 1026 yr. Theorists focus on understanding the nucleus models, the calculation of nuclear matrix elements and phase space factors for the 0□□□...

Guest Editor

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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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