Special Issue

Supersymmetry with Higgs Bosons Research

Message from the Guest Editors

In the Standard Model (SM) of particle physics, we break the electroweak symmetry and generate the masses of elementary particles via a Higgs field, which was discovered at the LHC. Although the SM is phenomenologically successful, it still suffers from the fine-tuning problem in stabilizing the electroweak symmetry-breaking scale. Thus, researchers usually regard it as an incomplete theory. Fortunately, this problem can be solved by imposing so-called supersymmetry on the theory. Every SM particle must have its supersymmetric partner with a spin difference of 1/2. This partner can cancel out the SM particle's quantum contribution to the Higgs potential and thus stabilize the electroweak symmetry-breaking scale. This SI will focus on the Higgs phenomenology in both the Minimal Supersymmetric Standard Model and its various extensions, including theoretical predictions and experimental limitations of Higgs properties, and the detection of Higgs signals on different colliders. It also includes research on vacuum stability, electroweak first-order phase transition, and related issues.

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Deadline for manuscript submissions

closed (31 July 2024)

Symmetry

an Open Access Journal by MDPI

Impact Factor 2.2
CiteScore 5.3

mdpi.com/si/95916

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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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