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Recent Advance in Accelerator and Particle Physics

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Message from the Guest Editors

Dear colleagues,

Symmetries are at the core of many aspects of fundamental physics and in particular quantum field theory, which the Standard Model of particles and interactions builds on. For instance, the Higgs boson was predicted in 1964 as a result of spontaneous electroweak symmetry breaking. For a long time, it was the last missing building block of the Standard Model. Therefore, its observation by the ATLAS and CMS experiments at CERN's Large Hadron Collider (LHC) in 2012 is one of the most important physics discoveries of the past few decades. It was achieved after only two years of proton–proton collision data-taking at the LHC, and at lower energies than those reached in the Run-2 of the LHC in 2015-2018. Particle physicists now have a large dataset at their disposal in order to measure the properties of Higgs bosons, but also to probe other Standard Model processes with unique precision. However, the Standard Model is known for not being a complete theory, and new physics is expected at the energy scale that LHC experiments can now probe...

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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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