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Symmetry in Hadron Physics

Guest Editor:

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Message from the Guest Editor

Dear Colleagues,

With the advance of high-energy physics experiments, new hadron states are continuously reported and experimental data on hadron properties are accumulated. To understand the experimental data, various pictures, conventional three-quark baryons, quark-antiquark mesons, pentaquark states, tetraquark states, quark-gluon hybrid states, glue-ball, etc., are proposed. Just as the study of the atomic spectrum leads to the invention of quantum mechanics, the study of the hadron spectrum will deepen our understanding of quantum chromodynamics (QCD). Because of the nonperturbative property and complexity of QCD, one cannot directly apply QCD to hadron physics. Clearly, symmetry plays a fundamental role in these approaches. In fact, the Gel-Mann–Zweig quark model was based on SU(3) flavor symmetry. Nowadays, various symmetries, chiral symmetry and its breaking, heavy-quark spin symmetry, hidden local symmetry, etc., are proposed and applied in hadron physics.

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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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