



Search for New Phenomena in Heavy-Quark Physics

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Deadline for manuscript
submissions:

closed (15 February 2022)

Message from the Guest Editor

Two consequences of the SM symmetries have attracted particular attention in recent years: (i) The broken $SU(2) \times U(1)$ symmetry leads to a suppression of weak transitions between quarks of the same electric charge but different flavors (flavor-changing neutral currents, FCNC). A number of tensions between SM predictions and the experimental data in FCNC decays of heavy b-quark have been observed, thus raising hopes to see the first indications of physics beyond the SM in the interactions of elementary particles; (ii) the $SU(3)$ color gauge symmetry allows the existence not only of ordinary mesons and baryons but also of exotic multi-quark hadrons; experimental data bring increasing evidence of such exotic hadrons involving one or two heavy quarks, demanding a theoretical understanding of their structure.

Both of these seemingly different phenomena have a common dynamical feature: FCNC processes in the SM as well as the formation of exotic hadrons proceed through loop diagrams. This Special Issue is dedicated to recent progress in the theoretical understanding of these two interesting phenomena.





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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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