



Strong Interactions in the Standard Model: Massless Bosons to Compact Stars

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Message from the Guest Editors

The Standard Model of particle physics (SM) was formulated roughly fifty years ago, and it was completed in 2012 with the discovery of the Higgs boson at CERN. Yet, despite the SM's enormous array of successes, it still presents an array of unsolved problems. Primary amongst them is the following question: Can the SM explain the origin of nuclear size masses? This is the puzzle of emergent hadron mass (EHM), whose solution is supposed to lie within quantum chromodynamics (QCD), the SM's strong-interaction component. EHM could provide the unifying explanation for all of the SM's remarkable nonperturbative phenomena, including confinement and absolute stability of the proton, the proton's mass and radii, the lepton-like scale of the pion mass and its hadron-like radius, and so much more, including the character and composition of dense astrophysical objects. Reflecting the scope of the associated endeavors, this volume collects a diverse range of perspectives on the problem of EHM, its observable manifestations, and the approaches and tools that are today being employed to deliver an insightful understanding and, perhaps, finally, a solution.

