

Light-Cone Physics and Large-Momentum Effective Field Theory

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In high-energy scattering, the physics of hadrons can be described by various light-cone correlation functions, which include parton distributions, generalized parton distributions, distribution amplitudes, as well as the so-called light-cone wave functions. Because of their explicit time-dependence, these quantities cannot be calculated directly from QCD using Monte Carlo simulations. For years, theorists have resorted to analytical approaches such as light-cone quantization, with little success. In this talk, I will introduce large-momentum effective field theory as a novel approach to extract light-cone correlation functions from Euclidean observables calculable in lattice QCD. Some of recent successful examples are discussed, including the gluon helicity contribution to the proton spin and isovector parton densities.

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