

The Electron-Ion Collider: A facility to bring the era of quantitative QCD to maturity

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Due to confinement, much of the richness as well as the challenge of quantum chromodynamics lies in relating the partonic degrees of freedom in the fundamental field theory to the hadronic degrees of freedom that we can observe. Within the context of high-energy QCD, the ability to factorize short-distance, perturbatively calculable partonic scattering cross sections from long-distance functions describing hadron structure or formation, and the ability to evolve the long-distance functions measured at one scale in order to make predictions at a different scale, have been critical phenomenological tools for several decades. In the 1990s and early 2000s the development of resummation techniques enabled quantitative treatment of a variety of multiscale observables. As an extremely versatile next-generation facility for the study of QCD, the Electron-Ion Collider promises to bring the era of quantitative QCD to maturity, prompting the community to push the limits of applicability of current theoretical ideas, and inspiring new ones. Prospects for various types of physics measurements at the EIC will be discussed.

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