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Prospects for EIC-driven advances in HEP phenomenology and Lattice QCD¹ TIMOTHY HOBBS, Southern Methodist University and EIC Center at Jefferson Lab, BO-TING WANG, PAVEL NADOLSKY, FREDRICK OLNESS, Southern Methodist University — As typified by the recent report of the National Academies, the goal of constructing a high-luminosity electron-ion collider (EIC) is crucial to the future of nuclear and hadronic physics. This machine will dramatically enhance our knowledge of a wide array of phenomena at work in QCD bound states by providing a comprehensive mapping of the internal tomography of hadrons, including the proton and lighter mesons. While these explorations of hadron structure will extend to transverse momentum-dependent observables, in this talk I focus on the prospects for an EIC to sharpen our understanding of the proton's unpolarized parton distribution functions (PDFs) and the resulting implications for high-energy phenomenology. Modern information on nucleon PDFs arise from many experiments covering vast reaches of kinematical parameter space; I will place the EIC within this larger context and illustrate its ability to provide durable constraints. In addition, I will also highlight the potential of the future EIC program to serve as the basis for a powerful synergy between studies of hadron tomography and lattice QCD calculations.

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Timothy Hobbs
Southern Methodist University and EIC Center at Jefferson Lab

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