HAW14-2014-000023

Abstract for an Invited Paper
for the HAW14 Meeting of
the American Physical Society

The Nucleus as a Laboratory for Gluons at an EIC[1]

YURI KOVCHEGOV, The Ohio State University

We will review the physics of high gluon density probed in high energy collisions. We will describe how the high gluon density is achieved inside the nuclear wave function at low values of Bjorken-x via the nonlinear evolution equations. The gluon density may get high enough for gluon mergers to start compensating gluon splittings, leading to the phenomenon of gluon saturation. These effects are further amplified in large nuclei, which reach saturation at lower energies (higher x) than protons or light nuclei due to the classical gluon field dynamics. We will describe how the discovery of the saturation physics can be completed and the dense gluon systems can be studied in Deep Inelastic Scattering (DIS) experiments on nuclei at the proposed Electron-Ion Collider (EIC). High gluon density would manifest itself in the measured nuclear structure functions and di-hadron correlations. It would have a particularly visible impact on the diffractive cross section, rendering it larger than what the non-saturation physics would expect it to be. Understanding the physics of saturation would lead to profound progress in our knowledge of QCD and would lead to important consequences for the theory of hadronic and heavy ion collisions.

[1]This research is sponsored in part by the U.S. Department of Energy under Grant No. DE-SC0004286.