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Cold Nuclear Matter Effect for Heavy Flavor at EIC

Deep inelastic scattering on nuclei at the Electron-Ion Collider will open new opportunities to investigate the structure of matter. Heavy flavor jets and hadron productions are complementary probes of the partonic composition and transport coefficients of large nuclei, but introduce a new mass scale that modifies the structure of parton showers and must be carefully accounted for in perturbative calculations. In the framework of soft-collinear effective theory with Glauber gluon interactions, we present the first calculation of inclusive heavy flavor jet and meson production in electron-nucleus collisions. The comprehensive study allows us to identify the optimal observables, center-of-mass energies, and kinematic regions most sensitive to the physics of energy loss and hadronization at the EIC.

Author: LI, Haitao (Shandong University)

Presenter: LI, Haitao (Shandong University)