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Heavy flavor production and large-x nuclear gluons at EIC

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Heavy flavor production in DIS (open charm, beauty) provides a direct probe of the gluon density in the target. It can be used to determine the unknown nuclear modifications of the gluon density at large x (EMC effect, antishadowing), which reveal the fundamental QCD substructure of nucleon interactions in the nucleus. We report about a study of open charm production in nuclear DIS at a future EIC. This includes (a) the charm production rates and kinematic distributions at large x ; (b) charm reconstruction with exclusive D-meson decays and/or inclusive modes, enabled by the PID and vertex detection capabilities of EIC; (c) the impact of charm data on nuclear gluons; (d) possible extensions to other channels (photoproduction, beauty, jets). We present results of simulations of charm reconstruction obtained with a schematic model of the EIC detector (tracking, vertexing) and outline the performance requirements. The simulation tools developed for this purpose can be used for other EIC studies.

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