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Open heavy flavor and jet studies for the future Electron-Ion Collider

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The proposed high luminosity high energy Electron-Ion Collider (EIC) will provide a clean environment to precisely study the nuclear modification of the nuclear parton distribution functions (nPDFs) and hadronization processes within a wide x - Q^2 phase space. Heavy flavor hadron and jet measurements at the future EIC will allow us to better determine the nPDFs in the poorly constrained high Bjorken- x region and provide enhanced sensitivities to the nuclear transport properties in medium. Studies of flavor tagged hadrons or jets and their correlations at the EIC provide a unique path to explore the flavor dependent fragmentation functions and energy loss in heavy nuclei, which can constrain the initial state effects for previous and ongoing heavy ion measurements at Relativistic Heavy Ion Collider (RHIC) and the Large Hadron Collider (LHC). We will present recent results of heavy flavor hadron and jet reconstruction in simulation and the corresponding physics projection such as the flavor dependent hadron nuclear modification factor in electron+nucleus collisions. Initial design and performance of a proposed forward (proton/nuclei going direction) silicon tracking detector, which is essential to carry out these measurements at the EIC will be shown as well.

Primary author: Dr LI, Xuan (Los Alamos National Laboratory)

Co-author: WONG, Cheuk-Ping (LANL)

Presenter: Dr LI, Xuan (Los Alamos National Laboratory)

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