

Accessing the Gluon Sivers Function at a future Electron-Ion Collider

Thursday, 13 September 2018 15:10 (20 minutes)

In this work, we present a systematic study on the feasibility of probing the largely unexplored transverse momentum dependent gluon Sivers function (GSF) in open charm production, high p_T charged di-hadron and di-jet production at a future high energy, high luminosity Electron-Ion Collider (EIC). The Sivers function is a measure for the anisotropy of the parton distributions in momentum space inside a transversely polarized nucleon. It is proposed that it can be studied through single spin asymmetries in the photon-gluon fusion subprocess in electron proton collisions at the EIC. Using a well tuned Monte Carlo model for deep inelastic scattering, we estimate the possible constraints of the GSF from the future EIC data. A comparison of all the accessible measurements illustrates that the di-jet channel is the most promising way to constrain the magnitude of the GSF over a wide kinematic range.

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Session Classification: Future Facilities and Experiments

Track Classification: Future Facilities and Experiments