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## Measuring gluon Sivers function at a future Electron-Ion Collider

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In this work, we present a systematic study on the feasibility of probing the largely unexplored gluon Sivers function (GSF) based on the open charm production, charged dihadron and dijet method at a future high energy, high luminosity Electron-Ion Collider (EIC). Sivers function describes the anisotropy of parton distributions inside a transversely polarized nucleon in the momentum space and provides us a complete picture of the 2+1D structure of the nucleons. It is proposed that the GSF can be studied through the single spin asymmetry (SSA) measurement in the photogluon fusion channel with electron proton collisions at the EIC. Using a well tuned Monte Carlo model for deep inelastic scatterings, we estimate the possible constraints of the gluon Sivers effect one can draw from the future EIC data. Comparisons of all the possible measurements further illustrate that the dijet method is the most promising way to demonstrate the presence of GSF and pin down its evolution effect.

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