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Indications of process dependence and the Sivers effect[1]
LEONARD GAMBERG, Penn State University-Berks, ZHONGBO KANG, Theoretical Division, Los Alamos National Lab, ALEXEI PROKUDIN, Theory Division, Jefferson Lab — We analyze the spin asymmetry for single inclusive jet production in proton-proton collisions collected by AnDY experiment at the Relativistic Heavy Ion Collider and the Sivers asymmetry data from semi-inclusive deep inelastic scattering experiments. In particular, we consider the role color gauge invariance plays in determining the process-dependence of the Sivers effect. We find that after carefully taking into account the initial-state and final-state interactions between the active parton and the remnant of the polarized hadron, the calculated jet spin asymmetry based on the Sivers functions extracted from HERMES and COMPASS experiments is consistent with the AnDY experimental data. This provides a first indication for the process-dependence of the Sivers effect in these processes.[2] We also make predictions for both direct photon and Drell-Yan spin asymmetry, to further test the process-dependence of the Sivers effect in future experiments.

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