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Transverse Spin Effects in Two Hadron Electroproduction

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The measurement of various angular single spin asymmetries (SSA) in a single hadron production off a transversely polarized target in semi-inclusive deep inelastic scattering (SIDIS) process allows to access both the Sivers and Collins effects describing the correlations of the the transverse spin and transverse momenta in both parton distribution and fragmentation functions. In our recent work we have explored both Sivers and Collins effects in the two-hadron SIDIS process. We showed that non-vanishing Sivers-effect-induced SSAs exist for modulations involving sines of the azimuthal angles of both the total and the relative transverse momenta of the hadron pair with respect to the the azimuthal angle of the nucleon's transverse spin. We have made projections for the sizes of these SSAs for the kinematics of the CLAS12 and EIC experiments. Similarly, in the fragmentation of a transversely polarized quark we used the NJL-jet model to demonstrate that Collins effect generates modulations of the polarized fragmentation function involving the sines of the same azimuthal angles of the hadron pair's transverse momenta, now with respect to the transverse quark spin. Moreover, our results for the Collins effect modulations are consistent with the recent experimental measurements by the COMPASS collaboration. These results help to demonstrate that the experimental measurements in two hadron SIDIS process can provide additional information for precise extractions of Sivers and Collins functions.

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