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Studies of Spin-Orbit Correlations with Longitudinally Polarized Target at CLAS12 KAWTAR HAFIDI, Argonne National Laboratory, CLAS COLLABORATION — Azimuthal distributions of final state particles in semi-inclusive deep inelastic scattering (SIDIS) provide access to the orbital motion of quarks and play a key role in the study of transverse momentum dependent (TMD) parton distributions. A comprehensive program to study the transverse momentum dependence of valence-quark transverse and longitudinal spin distributions through measurements of single-spin and double-spin azimuthal asymmetries in the SIDIS of pions using the upgraded JLab 11 GeV polarized electron beam and the CLAS12 detector with longitudinally polarized proton and deuteron targets has recently been proposed. The $\sin(2\phi)$ azimuthal moment of the target-spin-dependent part of the cross section, in particular, will provide direct information on spin-orbit correlations because the leading twist TMD parton distribution is related to the interference between states with different orbital angular momenta. The p_T dependence of the double spin asymmetry will provide information on the transverse momentum dependence of the quark helicity distributions that is complimentary to the single-spin asymmetry measurements.

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