SES16-2016-000261

Abstract for an Invited Paper
for the SES16 Meeting of
the American Physical Society

Measuring the Transverse Proton Structure with SoLID[1]

TIANBO LIU, Duke University

The Solenoidal Large Intensity Device (SoLID) has been proposed in Hall A at Jefferson Lab, which will fully utilize the great physics potential of the 12-GeV energy upgrade by combining high luminosities and large acceptance. Three of five highly-rated approved experiments are the semi-inclusive deep inelastic scatterings (SIDIS) of 11 GeV and 8.8 GeV electron beams on transversely and longitudinally polarized helium-3 targets and a transversely polarized proton target with the detection of charged pions and electrons in coincidence to study the transverse momentum dependent parton distributions (TMDs). The SoLID SIDIS experiment will provide 4D (x, z, Q^2, P_T) mappings of the azimuthal asymmetries in the valence quark region with high precision. In this talk, we take the Collins asymmetry as an example to show the SoLID impacts on the extraction of the transversity distributions and the tensor charges. We develop a simple strategy based on the Hessian matrix analysis that allows one to estimate the uncertainties of the transversity distributions and the tensor charges extracted from SoLID data simulation. We find that the SoLID measurements with proton and effective neutron targets will improve the precision of u and d quark transversity distributions and tensor charges up to one order of magnitude.

[1]This work is supported in part by the US Department of Energy under contract numbers DEFG02- 03ER41231 and by the Duke Kunshan University.