

Probing sea-quarks' orbital angular momentum contribution to the nucleon spin: The SpinQuest (E1039) experiment at Fermilab

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Abstract :

The SpinQuest experiment (E1039) at Fermilab aims to extract the Sivers functions for the light sea-quarks as part of a global effort to understand the nucleon's missing spin. SpinQuest will measure the correlation between the angular distribution of the di-muons and the spin-polarization of the nucleon through the Transverse Single Spin Asymmetry (TSSA) from the Drell-Yan (DY) process, using an unpolarized 120 GeV proton beam interacting with a solid polarized fixed target of either NH_3 (for proton) or ND_3 (for neutron). In addition to the Drell-Yan TSSA measurements, J/ψ TSSAs will also be measured to extract the gluon Sivers function. This presentation will discuss the current status and plans of the SpinQuest experiment, and put it into a global context. It will consider SpinQuest's unique kinematic coverage, which will serve as a bridge between probing valence-quarks and kinematics for the sea-quarks at future Electron-Ion Collider (EIC) experiments.