

Measurement of transverse single-spin asymmetries for J/ψ production in polarized $p + p$ collisions at $\sqrt{s} = 15\text{GeV}$

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The transverse single-spin asymmetry (TSSA) is a measure of the imbalance in particle production concerning the plane defined by the transverse spin axis and the direction of momentum of a polarized hadron. TSSAs have gained recognition as a method for examining Quantum Chromodynamics (QCD), both within the initial-state hadrons and during the process of hadronization from partons. In J/ψ production, which involves processes with initial-state gluons, TSSAs of J/ψ offer insight into gluon dynamics within the nucleon. The SpinQuest experiment (E1039) at Fermilab employs an unpolarized 120GeV proton beam colliding with a polarized fixed target composed of either NH_3 or ND_3 . This experiment aims to derive Sivers functions for the light sea-quarks within the range of $0.1 < x_B < 0.5$. These measurements are crucial for deducing the gluon Sivers function and provide a unique kinematic coverage, acting as a link between investigating valence quarks and the kinematics studied in future Electron-Ion Collider (EIC) experiments. In this talk, I will discuss the present status of SpinQuest and preliminary results obtained from beam commissioning data. This work was supported in part by US DOE grant DE-FG02-94ER40847.

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