

Constraining Quark Transversity through Collins
Asymmetry Measurements in Mid-Rapidity Jets
in $p^\uparrow p$ Collisions at STAR
2010 International Nuclear Physics Conference
(INPC2010)

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March 15, 2010

Abstract

First quantitative insights of transverse quark spin degrees of freedom in the proton have been obtained from Belle measurements of Collins fragmentation in e^+e^- collisions with HERMES and COMPASS measurements of the Collins asymmetry in deep-inelastic lepton-nucleon scattering. Further constraints can be added from measurements of the azimuthal asymmetry of leading charged pions in jets produced by transversely polarized proton collisions. This asymmetry can be expressed as a convolution of the quark transversity, the Collins fragmentation function and a hard-scattering spin-transfer coefficient. We present the status of the first such asymmetry measurement from $\sqrt{s}=200$ GeV transversely polarized ($\sim 58\%$) proton collision data (totalling $\sim 1 \text{ pb}^{-1}$) collected at the Solenoidal Tracker at RHIC (STAR), with full azimuthal coverage at mid-rapidity ($|\eta| < 1$). Available data give a statistical precision of $\sigma \sim 0.01$, for average quark momentum fraction $\langle x \rangle \sim 0.2$, at each of four intervals over $0.1 < z < 0.6$.