

PROBING THE ORIGIN OF THE PROTON SPIN WITH JETS AT STAR

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The STAR Collaboration at RHIC is exploring the partonic origin of the proton spin with a broad range of jet measurements in polarized pp collisions. STAR measurements of the longitudinal double-spin asymmetry, A_{LL} , for inclusive jet production in pp collisions at 200 GeV provide the first clear evidence that the gluons in the proton with $x > 0.05$ are polarized. Recent follow-up studies include measurements of A_{LL} for inclusive jets in 510 GeV pp collisions, which push the sensitivity to gluon polarization down to $x \sim 0.02$, measurements of A_{LL} for di-jet production at 200 and 510 GeV, which provide more precise information regarding the shape of $x\Delta g(x)$, and the first investigation of A_{LL} for the underlying event accompanying jet production. STAR measurements of the transverse single-spin dependence of the azimuthal modulation of pions in jets, $A_{UT}^{\sin(\phi_S - \phi_H)}$, at 200 and 500 GeV provide the first evidence of the Collins effect in pp collisions. The results enable tests of universality and factorization-breaking effects for transverse-momentum-dependent distributions (TMDs) in hadronic interactions, and set limits on the impact of TMD evolution over the range $Q^2 = 150$ to 900 GeV^2 . Additional transverse modulations provide limits on gluon linear polarization and the twist-3 analog of the gluon Sivers distribution. The current status of these analyses and the prospects to extend them with additional data in the near future will be discussed.