

Longitudinal Double-Spin Asymmetry for Inclusive and Di-Jet Production in Polarized Proton Collisions at $\sqrt{s} = 200$ GeV

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The contribution of the gluon helicity to the spin of the proton is being studied through the use of the unique capability of the Relativistic Heavy Ion Collider (RHIC) to collide polarized protons at $\sqrt{s} = 200$ GeV and $\sqrt{s} = 510$ GeV. The kinematic coverage of the Solenoidal Tracker At RHIC (STAR) allows access to gluons through quark-gluon and gluon-gluon scattering processes which dominate jet production at low and medium transverse momentum. The polarized gluon distribution function, $\Delta g(x)$, can be constrained through a global analysis by measuring the longitudinal double-spin asymmetry (A_{LL}) of inclusive jet and di-jet production.

Inclusive jet A_{LL} results published by STAR at mid-rapidity ($|\eta| < 1$) at $\sqrt{s} = 200$ GeV have been used in global analyses and show a non-zero truncated first moment of $\Delta g(x)$ for momentum fraction, x , greater than 0.05. An additional data sample of 43 pb^{-1} has been collected in 2015. This new data sample is 115% larger than the previous sample and will improve the precision of $\Delta g(x)$ for $x > 0.05$. The status of this new inclusive jet analysis will be presented along with the status of a di-jet analysis using the same data.