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Longitudinal double-spin asymmetries of inclusive jet and di-jet production at STAR

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The Solenoidal Tracker at the Relativistic Heavy Ion Collider (STAR) experiment probes the gluon helicity distribution $\Delta G(x)$ using collisions of longitudinally polarized protons at $\sqrt{s} = 200$ GeV and $\sqrt{s} = 510$ GeV. Access to $\Delta G(x)$ is possible through the double spin asymmetries A_{LL} in gluon-dominated hard scattering processes of inclusive jet and di-jet production.

Previously published results on inclusive jet processes at $\sqrt{s} = 200 \text{ GeV}$ and $|\eta_{\text{jet}}| < 1$ are based on data collected in 2009, which correspond to an integrated luminosity (*L*) of 20 pb⁻¹ with an average beam polarization (*P*) of 57%. When included in perturbative QCD analysis of global data, they provide evidence for positive gluon polarization for a momentum fraction x > 0.05 at a hard perturbative scale $Q^2 = 10 \text{ GeV}^2$. Additional data were collected in 2015 with an approximately twice larger figure of merit (*LP*⁴). This contribution will cover the status of the analysis of 2015 inclusive jet and di-jet data, as well as, the jet measurements based on the most recent high-luminosity 510 GeV data collected in 2013, which will further constrain $\Delta G(x)$ at lower x.

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