

# Gluon Polarization from Longitudinally Polarized Proton Collisions at STAR

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The contribution to the spin of the proton from its constituents has been one of the unresolved questions in nuclear physics. The longitudinal spin program at STAR is exploring a wide range of measurements to determine the gluon helicity distribution inside the proton. The inclusive jets and pions in the kinematic range accessed by RHIC are dominated by quark-gluon and gluon-gluon scattering processes. The longitudinal double-spin asymmetry ( $A_{LL}$ ) is sensitive to polarized parton distributions and can be used to extract information about the gluon helicity contribution ( $\Delta G$ ) to the spin of the proton. The 2009 STAR inclusive jet  $A_{LL}$  measurements at  $\sqrt{s} = 200$  GeV showed the first evidence of polarized gluons for gluon momentum fractions above 0.05. The data collected at  $\sqrt{s} = 510$  GeV will extend the current constraints on  $\Delta G$  to lower gluon momentum fractions, and the measurement of dijet  $A_{LL}$  will allow for the reconstruction of the partonic kinematics at leading order. This presentation will focus on the recent results from the  $A_{LL}$  measurements at STAR, and how they extend the sensitivity to the gluon spin contributions at lower momentum fractions.