

Exploring Gluon and Antiquark Polarization in the Proton with STAR

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The STAR Collaboration is performing a wide range of measurements to determine the gluon and antiquark helicity distributions in the proton. The longitudinal double-spin asymmetries, A_{LL} , for inclusive jet and dijet production provide direct access to the gluon polarization. The parity-violating single-spin asymmetries, A_L , for $W^{+/-}$ production are sensitive to the \bar{u} and \bar{d} antiquark polarizations. STAR recorded large polarized proton data sets in 2009 at $\sqrt{s} = 200$ GeV and in 2012 and 2013 at $\sqrt{s} = 510$ GeV. The 2009 mid-rapidity inclusive jet A_{LL} results place stringent new constraints on the polarized gluon distribution and provide evidence for positive gluon polarization in the Bjorken- x region $x > 0.05$. The 2012 W asymmetry results show a preference for a sizable, positive \bar{u} antiquark polarization in the range $0.05 < x < 0.2$. The inclusive jet A_{LL} and W A_L measurements will be discussed, and status reports will be provided regarding similar measurements with the more recent data sets.

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