

Gluon polarization and jet production at STAR

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At RHIC kinematics, polarized jet hadroproduction is dominated by gg and qg scattering, making the jet double-helicity asymmetry, A_{LL} , sensitive to gluon polarization in the nucleon. Previous STAR measurements of A_{LL} for inclusive jet production at $\sqrt{s} = 200$ GeV during the 2006 RHIC run [1] provided significant constraints on the gluon contribution to the proton spin over the Bjorken- x range $0.05 < x < 0.2$ [2]. Recently, STAR has released preliminary measurements of A_{LL} for inclusive jet and di-jet production at $\sqrt{s} = 200$ GeV from a much larger data set recorded during 2009 [3,4]. These preliminary results provide the first experimental evidence of non-zero gluon polarization in the x range sampled at RHIC [5]. Since then, substantial progress has been made on reducing and finalizing the systematic uncertainties in the 2009 inclusive jet A_{LL} measurement. In this talk, I will discuss the STAR jet A_{LL} measurements and their implications for the gluon polarization in the proton. I will also discuss STAR future plans for more high-precision jet data at $\sqrt{s} = 200$ GeV and 500 GeV.

[1] L. Adamczyk *et al.* (STAR Collaboration), *Phys. Rev. D* **86**, 032006 (2012).

[2] D. de Florian, R. Sassot, M. Stratmann, and W. Vogelsang, *Phys. Rev. Lett.* **101**, 072001 (2008).

[3] P. Djawotho (STAR Collaboration), arXiv:1106.5769.

[4] M. Walker (STAR Collaboration), arXiv:1107.0917.

[5] D. de Florian, R. Sassot, M. Stratmann, W. Vogelsang, *Prog. Part. Nucl. Phys.* **67**, 251 (2012).