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Constraining ΔG at Low- x with Double Longitudinal Spin Asymmetries for Forward Hadron and Di-Hadron Pairs in PHENIX SCOTT WOLIN, University of Illinois at Urbana-Champaign, PHENIX COLLABORATION — The gluon polarization, $\Delta G = \int_0^1 g(x)dx$, is constrained in the region $0.05 < x < 0.2$ from measurements of double spin asymmetries, A_{LL} , for inclusive hadron and jet production at mid-rapidity at RHIC. Theoretical analysis of experimental results shows that $\int_{0.05}^{0.2} \Delta g(x)dx = 0.013_{-0.120}^{+0.106}$. This is not large enough to account for the missing proton spin. However, $\Delta g(x)$ is unconstrained at low- x , and a measurement sensitive to this region will provide important input for future global analyses. The measurement of A_{LL} for inclusive hadrons and di-hadrons with the Muon Piston Calorimeter (MPC) $3.1 < \eta < 3.9$ provides this sensitivity down to $x \sim 10^{-3}$ and will lead to the first constraints of $\Delta g(x)$ at $x < 0.05$. The di-hadron measurement is especially interesting as it is sensitive to the sign of ΔG and best constrains the parton kinematics giving the most precise access to x_{gluon} . The inclusive measurement provides a looser constraint on the event kinematics but has a higher yield. We will present the status of these measurements for the 2009 dataset at $\sqrt{s} = 500GeV$ and $\sqrt{s} = 200GeV$.

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