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Direct photon cross section and double helicity asymmetry at mid-rapidity in $\vec{p}$+$\vec{p}$ collisions at $\sqrt{s} = 510$ GeV ZHONGLING JI, Stony Brook University, PHENIX COLLABORATION — Double helicity asymmetries A_{LL} in hadron, jet and direct photon production in $\vec{p}$+$\vec{p}$ collisions at the Relativistic Heavy Ion Collider (RHIC) are sensitive to the gluon helicity contribution to the proton's spin. Unlike hadrons and jet, direct photon production provides clean access to the polarized gluon distribution since there is no hadronization. However, the small direct photon production cross section compared to that of π^0 and jet production has so far limited its utility in extracting the polarized gluon distribution. With recent increases in RHIC luminosity, we expect this limitation to be partially overcome and try to revisit this "golden" measurement of polarized gluons based on RHIC data from 2013. This analysis measures the direct photon cross section and A_{LL} from the data collected employing the PHENIX detector at mid-rapidity ($|\eta| < 0.35$). This will be the first direct photon cross section and A_{LL} measurement in $\vec{p}$+$\vec{p}$ at $\sqrt{s} =$ 510 GeV with this detector. In this talk I will present the status of direct photon cross section and A_{LL} analysis.

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