

Measurement of the direct photon production in polarized proton-proton collisions at $\sqrt{s}=200\text{GeV}$ with PHENIX

Takuma Horaguchi for the PHENIX Collaboration

*Center for Nuclear Study, Graduate School of Science, University of Tokyo
2-1, Hirosawa, Wako, Saitama, 351-0198 Japan*

Polarized proton-proton collisions at the Relativistic Heavy Ion Collider (RHIC) can provide information on the structure of the proton. The proton spin consists of the spin of the quarks, the gluons, and their orbital angular momentum. The experiments using the polarized deep-inelastic lepton scattering (DIS) have measured the quark spin contribution to the proton and reported that the quark spin contribution is only 20-30% of the proton spin. This is called the "Spin Puzzle" and one of the solutions of this puzzle is the gluon spin contribution to the proton.

Direct photon production in polarized proton-proton collisions is a very useful probe to obtain the polarized gluon distribution function because the direct photon at high transverse momentum is produced mainly by quark-gluon Compton scattering ($qg \rightarrow \gamma g$). The measurement of the direct photon cross section is a test of perturbative Quantum ChromoDynamics (pQCD), and the measurement of the double longitudinal spin asymmetry gives us the polarized gluon distribution function.

In PHENIX, data with an integrated luminosity of 3.8pb^{-1} for longitudinally polarized collisions with 47% average polarization have been collected in the run of year 2005 at $\sqrt{s}=200\text{GeV}$. In this talk, the latest status of the direct photon analysis at PHENIX and future plan will be presented.