

# **Probing Gluon Contribution to Proton Spin with STAR 2015 Endcap Electromagnetic Calorimeter Data**

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Probing the gluon's contribution to proton spin is an important goal of the STAR experiment at the Relativistic Heavy Ion Collider (RHIC) located at Brookhaven National Laboratory. We aim to refine our knowledge of the gluon spin contribution to aid in solving the proton spin puzzle as the contributions of the proton's constituent parts to its spin remain uncertain. Our group will aid this effort by studying the STAR data taken in 2015 from  $\sim 50 \text{ pb}^{-1}$  of  $\sqrt{s} = 200 \text{ GeV}$  longitudinally polarized proton-proton (p+p) collisions. Our analysis focuses on the Endcap Electromagnetic Calorimeter (EEMC) which is stationed at a pseudorapidity range of  $1.1 < \eta < 2.0$  and can detect photons from the decays of neutral pions ( $\pi^0$ s). For our analysis, we store the reconstructed data in a series of three ROOT trees containing stages of the calorimeter, photon, and  $\pi^0$  reconstruction. A new data quality assurance (QA) method has been implemented for the ROOT trees which increases the number of entries in QA histograms such as the reconstructed  $\pi^0$  mass, signal fraction, and number of towers hit in the EEMC. The original QA method suffered from accidental losses from command line methods while the new method recovers them using full STAR libraries. The revised data will be used to calculate the spin-dependent asymmetry of  $\pi^0$  production ( $A_{LL}$ ), which is sensitive to the gluon's contribution to the proton's spin. The status and impact of the new quality assurance method will be presented along with prospects for the  $A_{LL}$  measurement.