

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

Zach Nielsen  
Valparaiso University  
For the STAR Collaboration

Longitudinally polarized protons are collided in the Solenoidal Tracker at RHIC (STAR) located at Brookhaven National Laboratory to study the gluon spin contribution to the spin of the proton. Refining our knowledge of the gluon spin contribution to the proton's spin will help us solve the proton spin puzzle and is one significant goal of the STAR collaboration. This study analyzes 2015 longitudinally polarized proton-proton collisions ( $\sqrt{s} = 200$  GeV) and the resulting neutral pions ( $\pi^0$ ) that are created. The  $\pi^0$ s decay almost instantaneously ( $\sim 10^{-16}$  s) into two photons that can be detected with STAR's Endcap Electromagnetic Calorimeter (EEMC,  $1.09 < \eta < 2.00$ ). By analyzing the  $\pi^0$ s that are produced we can calculate the spin-dependent asymmetry,  $A_{LL}$ , of the  $\pi^0$  which is related to the gluon contribution to the spin of a proton. We have reconstructed the 2015 data to form photon and  $\pi^0$  candidates. To ensure quality data for the eventual  $A_{LL}$  analysis, we monitor distributions such as the reconstructed  $\pi^0$  mass and the number of EEMC towers hit per event. We will present the status of the 2015 reconstruction and quality assurance effort.