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Measurement of the Longitudinal Double-spin Asymmetry for Neutral Pion Production in Polarized Proton Collisions at $\sqrt{s} = 510\text{GeV}$

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1 Double-Spin Asymmetry in Neutral Pion (π^0)
2 Production in Longitudinally Polarized $p + p$
3 Collisions

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7 Beyond the valence quarks' spin contribution to the total spin of a proton,
8 gluon and sea quark contributions are becoming clear as well. For proton-
9 proton collisions at a center of mass energy of 510 GeV, neutral pion produc-
10 tion is dominated by gluon-gluon and gluon-quark scattering. An avenue to
11 constrain the gluon polarization is the asymmetry, A_{LL} , in the production of
12 neutral pions from collisions of longitudinally spin-polarized proton beams.
13 Our experiment was performed with the STAR detector at the Relativistic
14 Heavy Ion Collider (RHIC), unique for its ability to collide spin-polarized pro-
15 ton beams. The Endcap Electromagnetic Calorimeter (EEMC) of the STAR
16 detector with its pseudorapidity (η) range between 1.09 and 2.00 and full
17 azimuthal coverage measures energies of photons from π^0 decays. We con-
18 sider the invariant mass of all photon pairs in the EEMC as we identify π^0
19 candidates. We will present the current status of the analysis of the π^0 A_{LL}
20 as measured by the EEMC at STAR in 2012 data with center-of-mass energy
of 510 GeV.