Abstract Submitted
for the HAW14 Meeting of
The American Physical Society

Measurement of longitudinal single-spin asymmetries for $W^{\pm}$ boson production in polarized $p+p$ collisions at $\sqrt{s} = 510$ GeV at RHIC[1] DEVIKA GUNARATHNE, Temple University, STAR COLLABORATION — $W^{\pm}$ boson production in longitudinally polarized $p+p$ collisions provides unique and clean access to the individual helicity polarizations of quarks and antiquarks in the colliding protons. Due to maximal violation of parity in the production, $W^{\pm}$ bosons couple to left-handed quarks and right-handed anti quarks and hence offer direct probes of their respective helicity distributions in the nucleon. These can be observed in measured large parity-violating longitudinal single-spin asymmetries A_L, as a function of decay lepton pseudo-rapidity η, for $W^{\pm}$ boson production at the STAR experiment at the Relativistic Heavy Ion Collider (RHIC). The final results of W A_L measured between $|\eta| < 1.1$ at $\sqrt{s} = 510$ GeV from the dataset collected in 2011 and 2012 running periods with an integrated luminosity of 86 pb^{-1} and an average beam polarization of $\sim$55% will be presented. The status for the analysis of W A_L from the larger dataset collected during 2013 (more than 3 times of 2012) at $\sqrt{s} = 510$ GeV with an average beam polarization of $\sim$54% will be reported.

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Date submitted: 30 Jun 2014 Electronic form version 1.4