Measurement of longitudinal single-spin asymetries for $W^{\pm}$ boson production in polarized $p+p$ collisions at $\sqrt{s} = 510$ GeV at RHIC

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$W^{\pm}$ 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 for W boson production at STAR experiment at Relativistic Heavy Ion Collider (RHIC).

The results of A_L, from the dataset with an integrated luminosity of 86 pb^{-1} which was collected during 2011 and 2012 RHIC $\sqrt{s} = 510$ GeV running period will be presented. In 2013 the STAR experiment has collected an integrated luminosity of $\sim$300 pb^{-1} at $\sqrt{s} = 510$ GeV with an average beam polarization of $\sim$54%, which is more than 3 times larger than the total integrated luminosity collected during year 2012. The status for the analysis of W A_L from the dataset collected during the 2013 running period will be reported.