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Measurement of Longitudinal Single-Spin Asymmetry for W Boson Production in Polarized Proton+Proton Collisions at STAR

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The sea quark contribution to nucleon spin is an important piece for a complete understanding of the nucleon spin structure. The production of W -bosons in longitudinally polarized $p + p$ collisions at RHIC provides a unique probe for the sea quark polarization, through the parity-violating single-spin asymmetry, A_L . At the STAR experiment, the leptonic decay channel $W \rightarrow e\nu$ can be effectively determined with the Electromagnetic Calorimeters and Time Projection Chamber at mid-rapidity. The previous STAR measurements of A_L for W boson from datasets taken in 2011 and 2012, have provided significant constraints on the helicity distribution functions of \bar{u} and \bar{d} quarks. In 2013 the STAR experiment collected an integrated luminosity of $\sim 300 \text{ pb}^{-1}$ at $\sqrt{s} = 510 \text{ GeV}$ with an average beam polarization of $\sim 56\%$, which is more than three times larger than the total integrated luminosity of previous years. The new preliminary results of W -bosons A_L from 2013 data sample will be presented.

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