

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

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The contribution from the sea quark polarization to the nucleon spin is an important piece for complete understanding of the nucleon spin structure. The production of W bosons in longitudinally polarized p+p collisions at RHIC provides a unique probe to the sea quark polarization, through the parity-violating single-spin asymmetry, AL. At STAR, the W bosons through the $W \rightarrow e\nu$ channel at mid-rapidity ($|\eta| < 1.3$) can be effectively determined with the Electromagnetic Calorimeters and Time Projection Chamber. The STAR measurements of AL for W boson from datasets taken in 2011 and 2012 at $\sqrt{s} = 510$ GeV, have been included in the global analysis of polarized parton distribution functions, and provided significant constraints on the helicity distribution functions of u-bar and d-bar quarks. In 2013 the STAR experiment collected a much larger data sample, about three times larger than the total integrated luminosity of previous years. The AL results from 2013 STAR data sample will provide further constraints on the sea quark polarization in the nucleon.

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