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$W^{\pm}$ Boson Production at Mid-rapidity in 500 GeV $p+p$ Collisions in the PHENIX Experiment MIKHAIL STEPANOV, University of Massachusetts, Amherst, PHENIX COLLABORATION — We search for $W^{\pm}$ boson decays through $e^{\pm}$ channels in polarized $p+p$ collisions at $\sqrt{s} = 500$ GeV at RHIC with the PHENIX central arm detectors, which cover $\mid \eta \mid \leq 0.35$. The $W^{\pm}$ production is an important probe of the flavor-separated quark and antiquark helicity distributions in the proton. In 2011, PHENIX collected data with an integrated luminosity of $\sim$17 pb^{-1} in 500 GeV $p+p$ collisions which is increased approximately by a factor of two in comparison with the previous 2009 data set; improved beam polarization was 46%. The status of the analysis of the new data will be reported. In 2011, the detector configuration was changed by important detector upgrades, which leads to an increased background from conversion in additional material. A supplementary analysis technique is required and developed to extract the signal in these background conditions.

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