

# PHENIX $W$ measurements in polarized $p + p$ collisions

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## Abstract

The measurement of the single spin asymmetry of parity violating  $W$  boson production in longitudinally polarized proton collisions provides unique and clean access to the light sea quark helicity distributions. The  $W$  boson couples only to left-handed quark and right-handed anti quark, and hence one can directly relate the charge of the  $W$  with initial state quark flavors. The PHENIX experiment at RHIC has performed the single spin asymmetry measurements at  $\sqrt{s} = 510$  GeV in 2011-2013.  $W$  bosons are accessed through their lepton decays at PHENIX, electrons at mid-rapidity ( $|\eta| < 0.35$ ) and muons at forward rapidity ( $1.2 < |\eta| < 2.4$ ). The analysis status and recent results will be presented.