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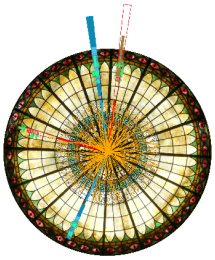

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Probing the Sea-Quark Contribution to Total Proton Spin via the Weak Interaction at PHENIX

Wednesday 29 April 2015 15:15 (25 minutes)

Over the past ten years, the RHIC spin program has deepened our knowledge of proton spin structure as part of a worldwide effort to solve the proton spin puzzle. While we now precisely understand the contribution of valence quarks to the total proton spin, large uncertainties still dominate the predictions describing the contributions of the sea of anti-up and anti-down quarks. In 2013, PHENIX accumulated $277pb^{-1}$ of longitudinally polarized proton-proton collisions at $510GeV$ in its full vertex acceptance. This data set is the culmination of a multi-year experimental effort to study the proton sea-quark polarization. From these collisions, we inclusively measure the W to lepton decay and probe the sea-quark helicities via the calculation of the longitudinal single spin asymmetries. Sea-quark helicities may be flavor separated via the charge of the W and decaying leptons, plus knowledge of the valence quark helicities. This method offers the advantage of giving clean access to the sea-quark helicities, in contrast to other methods which must deal with fragmentation. The measurement is carried out via the $W \rightarrow \mu$ channel in PHENIX's forward kinematic region, and via the $W \rightarrow e$ channel in the central region. We present the unique challenges and approaches to the study of the forward and central data sets alongside our analysis progress and results in this talk.

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