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Constraining the Sea Quark Distributions Through W^\pm Cross Section Ratio Measurements at STAR

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Over the past several years, parton distribution functions (PDFs) have become more precise. However there are still kinematic regions where more data are needed to help constrain global PDF extractions, such as the ratio of the sea quark distributions \bar{d}/\bar{u} near the valence region. Furthermore, current measurements appear to suggest different high- x behaviors of this ratio. The W cross section ratio (W^+/W^-) is sensitive to the unpolarized quark distributions at large Q^2 set by the W mass. Such a measurement can be used to help constrain the \bar{d}/\bar{u} ratio. The STAR experiment at RHIC is well equipped to measure the leptonic decays of W bosons, in the mid-pseudorapidity range ($|\eta| \leq 1$), produced in proton-proton collisions at $\sqrt{s} = 500/510$ GeV. At these kinematics STAR is sensitive to quark distributions near x of 0.16. STAR can also measure W^+/W^- in a more forward region ranging from $1.0 < \eta < 1.5$, which extends the sea quark sensitivity to higher x . RHIC runs from 2011 through 2013 have collected about 350 pb^{-1} of integrated luminosity, and an additional 350 pb^{-1} from the 2017 run. This talk will present preliminary results of the 2011-2013 W^+/W^- cross section ratio measurements.

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