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Constraining the Sea Quark Distributions Through W and Z Cross Sections and Cross-Section Ratios Measured 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 and Z bosons, in the pseudorapidity range ($-1.0 < \eta < 1.5$), produced in proton-proton collisions at $\sqrt{s} = 500/510$ GeV. These cross sections and their ratios are sensitive to quark and antiquark distributions in the x -range $0.1 < x < 0.3$. This talk will present preliminary results from the 2011-2013 RHIC runs, which total about 350 pb^{-1} of integrated luminosity. Measurements of the differential W and Z cross sections and the W^+/W^- cross-section ratio as a function of the lepton's pseudorapidity, as well as the W/Z cross-section ratio and total W and Z cross sections will be shown.

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