

1 **Constraining the Sea Quark Distributions Through W Cross-Section Ratios**
2 **Measured in pp Collisions at STAR**

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5 Although the precision to which we know the unpolarized parton distribution functions (PDFs) of
6 the nucleon has improved over the years, there are still kinematic regions where more data are
7 needed to constrain PDFs, such as the ratio of the sea quark distributions $d\text{-bar}/u\text{-bar}$ near the
8 valence region. Furthermore, different measurements appear to suggest different high- x
9 behaviors of this ratio. The W cross-section ratio (W^+/W^-) in pp collisions is sensitive to the
10 unpolarized sea quark distributions at large Q^2 , set by the W mass, and can be used to help
11 constrain the $d\text{-bar}/u\text{-bar}$ ratio. The STAR experiment at RHIC is well equipped to measure the
12 leptonic decays of W bosons, in the pseudorapidity range $-1.0 < \eta < 1.5$, produced in pp
13 collisions at center of mass energies of 500 and 510 GeV, which is sensitive to quark and
14 antiquark distributions in the x -range $0.1 < x < 0.3$. This talk will present recent W cross-section
15 ratio results measured by STAR, including preliminary results from data collected in 2017, which
16 double the statistics when combined with the published results based on data samples recorded
17 in 2011-2013 [1]. The impact that STAR's W cross-section ratio has on constraining the sea
18 quark distributions will also be discussed.

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21 [1] J. Adam, *et al.*, (STAR Collaboration), Phys. Rev. D 103, 012001 (2021).

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