Cross section measurements of kinematically reconstructed weak bosons in unpolarized $p+p$ collisions at STAR

Salvatore Fazio

Brookhaven National Laboratory

For the STAR Collaboration

Abstract

We present cross sections for the weak bosons measured by the STAR experiment at RHIC in unpolarized proton-proton collisions at $\sqrt{s} = 500(510)$ GeV. The results combine data from 2011, 2012, 2013, corresponding to an integrated luminosity of 360 pb^{-1}. An update including the 2017 data ($\sim$ 340 pb^{-1}) will be also discussed. The differential Z^0 cross section, measured as a function of the boson's p_T, provides important constraints on the energy dependence of transverse momentum distributions of partons inside the proton. The W^+/W^- cross-section ratio as a function of the boson's rapidity, is sensitive to the non-pertubative $\bar{d}/\bar{u}$ distribution. The probed x range ($0.1 < x < 0.3$) covered by our data naturally complements the phase space accessed at the LHC, providing critical inputs to global fits.