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Evidence of shadowing in inelastic nucleon-nucleon cross section

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The Glauber modeling plays a key role in centrality-dependent measurements of heavy-ion collisions. A central input parameter in Glauber models is the inelastic nucleon-nucleon cross section $\sigma_{nn}^{\text{inel}}$ which is nearly always taken from proton-proton measurements. At the LHC energies $\sigma_{nn}^{\text{inel}}$ depends on the QCD dynamics at small x and low interaction scales where the shadowing/saturation phenomena are expected to become relatively more important for larger nuclei than proton. Thus, $\sigma_{nn}^{\text{inel}}$ e.g. in Pb+Pb collisions may well be lower than what is seen in proton-proton collisions.

In this talk we demonstrate how to use the recent W^\pm and Z measurements as a “standard candle” to extract $\sigma_{nn}^{\text{inel}}$ in Pb+Pb collisions. Our analysis – built on the ATLAS data, state-of-the-art NNLO QCD calculations and nuclear PDFs – indicate that at the LHC energies $\sigma_{nn}^{\text{inel}}$ in Pb+Pb collisions is suppressed relative to the proton-proton measurements by tens of percents. We demonstrate that this is in line with expectations from nuclear PDFs.

Collaboration (if applicable)

Track

Electroweak Probes

Contribution type

Contributed Talk

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