

Probing nuclear PDFs with dijets in ultra-peripheral Pb+Pb collisions

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Precision of the current nuclear PDF (nPDF) analyses is limited due to the lack of data constraints especially at small- x region. Ultimately the best way to pin down the nPDF uncertainties would be the clean photon-induced processes in a high-energy lepton-ion collider. To some extent this can also be accomplished with ultra-peripheral heavy-ion collisions at the LHC where a quasi-real photon from one nucleus interacts with a nucleus from the other beam in an event where a large impact parameter prevents hadronic interactions.

In this talk we apply the photoproduction framework recently implemented into the Pythia 8 event generator to study the potential of photo-nuclear dijets in ultra-peripheral collisions to further constrain the nPDFs. The focus is in the x -region below the reach of the LHC data currently used in global analyses. In particular, we quantify the small- x reach with different jet kinematics and show how well the values of x derived from reconstructed jet momenta correlate with the actual values of x probed in these measurements. To demonstrate the constraining potential, we compare the expected experimental uncertainties to the current nPDF errors and discuss about other theoretical uncertainties including the uncertainty arising from poorly-constrained photon PDFs. Also the role of diffractive processes in jet production is briefly discussed.

Summary

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