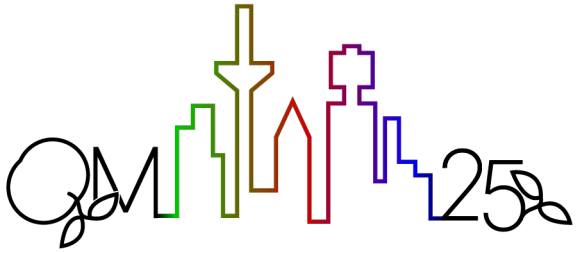

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Investigating the Antishadowing Effect in Nuclear PDFs through Dijet Nuclear Modification Factor R_{pA} in p-Pb Collisions Using PYTHIA and POWHEG

This study aims to investigate the antishadowing effect in nuclear parton distribution functions (nPDFs) by calculating the nuclear modification factor R_{pA} for dijets produced in proton-proton (pp) and proton-lead (p-Pb) collisions. To achieve this aim, we used Monte Carlo simulations using PYTHIA and PYTHIA+POWHEG event generators. These tools allowed us to apply various nPDF sets to evaluate the impact of antishadowing on dijet production.

Antishadowing refers to an enhancement of parton densities in nuclei at moderate momentum fractions. This enhancement significantly influences hard scattering processes in nuclear environments. Specifically, gluon antishadowing plays a crucial role in high-energy nuclear collisions, as gluons are key contributors to high-energy particle and jet production.

The R_{pA} results from our simulations show a slight enhancement in the dijet spectrum, reflecting the contribution from the antishadowing region in the lead nPDF. Both PYTHIA and PYTHIA+POWEHG models demonstrate consistent results. These findings provide an important benchmark for comparison with LHC experimental data. Furthermore, they offer insights that help constrain gluon antishadowing in nPDFs, thereby improving our understanding of initial-state effects in nuclear collisions.

Category

Experiment

Collaboration (if applicable)

Authors: KIM, Dongguk (Sungkyunkwan University (KR)); KIM, Beomkyu (Sungkyunkwan University)

Presenter: KIM, Dongguk (Sungkyunkwan University (KR))

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