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First measurement of the D^0 production in photonuclear ultraperipheral heavy ion collisions with CMS to probe low-x nuclear matter

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The study of heavy-quark photoproduction in ultraperipheral collisions (UPC) of heavy ions provides a new tool to characterize the production mechanisms of heavy-quarks with high experimental and theoretical control, and constrain the properties of nuclear matter in a wide region of the (x, Q^2) with perturbatively-produced hard probes. In this talk, we will present the first measurement of the production yield of D^0 mesons as a function of their transverse momentum and rapidity performed in ultraperipheral heavy ion collisions at 5.36 TeV, performed by CMS using the first heavy ion data from the LHC Run 3. The results are compared to recent calculations that describe the production of charm photoproduction in UPC and exploit different modeling of the nuclear parton distribution functions (nPDFs). These results will provide new insights into the nPDFs of gluons down to low x and Q^2 and pave the way for high-accuracy measurements of the heavy-quark production and shower evolution in the clean experimental environment that characterize photonuclear collisions.

Category

Experiment

Collaboration

CMS

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