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Probing the nucleus and nucleons with vector mesons in ultra-peripheral collisions in ALICE

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The strong electromagnetic fields associated with heavy-ions at the LHC lead to large cross sections for exclusive photoproduction of vector mesons in ultra-peripheral collisions (UPCs). Photoproduction of charmonium probes the distribution of gluons in the target nucleus. Earlier studies of charmonium photoproduction have focussed on measuring the production cross sections and rapidity distributions. More information can, however, be obtained from differential distributions, such as $\mathrm{d}\sigma/\mathrm{d}t$ at different rapidities. This enhances the sensitivity to the gluon distribution and opens up the possibility to extract also the spatial distribution of gluons. It may also contribute to a better understanding of the interplay between nuclear shadowing and gluon saturation. The energy dependence of the photoproduction cross section can be extracted by studying vector meson production in coincidence with neutron emission. Because of the interference betweeen the production sources (the two nuclei), vector meson production also serves as a two-slit interferometer at subatomic length scales. The interference can be probed by studying the azimuthal angular distributions. The latest results from ALICE on photoproduction of vector mesons will be presented.

Category

Experiment

Collaboration

ALICE

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