

## Photoproduction of $J/\psi$ in UPC accompanied by neutron emission

*Tuesday 12 December 2023 11:30 (15 minutes)*

Gluons are found to become increasingly dominant constituents of nuclear matter when being probed at higher energies or smaller Bjorken- $x$  values. This has led to the question of the ultimate fate of nuclear gluonic structure at extreme density. In ultraperipheral collisions (UPCs) of relativistic heavy ions, the coherent heavy flavor vector meson production via photon-nuclear interactions is of particular interest, since its cross section is sensitive to the nuclear gluon density. However, in symmetric UPCs, a two-way ambiguity in determining the photon-emitter and the target prevents the extraction of contributions involving high- and low-energy photon-nucleus interactions. This limitation, therefore, had so far reduced our capability to probe the extremely small- $x$  regime. In this talk, we will present the first measurement of coherent charmonium photoproduction, where the two-way ambiguity is solved by implementing a forward neutron tagging technique using UPC lead-lead collisions recorded by the CMS experiment at 5.02 TeV. Results of coherent  $J/\psi$  production will be presented. We will discuss the physics implications of these results, as well as exciting opportunities in future LHC heavy ion runs.

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