

# Detecting fluctuating gluonic structure via energy-dependent incoherent $J/\psi$ photoproduction in PbPb at 5.02 TeV with the CMS experiment

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In heavy ion ultraperipheral collisions (UPCs), the production of  $J/\psi$  through photon-nuclear interactions is of particular interest, as its cross section is highly sensitive to the properties of gluons within heavy nuclei. Photons can interact with the nucleus coherently (involving the entire nucleus) or incoherently (with individual nucleons). While coherent interactions probe the average gluon densities of the nucleus, incoherent interactions offer unique sensitivity to the local gluon density fluctuations at the nucleonic or subnucleonic levels. Studies of incoherent  $J/\psi$  photoproduction hold promise for shedding new light on the dynamic evolution of fluctuating gluonic structures within nuclei and potentially uncovering the onset of gluon saturation towards the small- $x$  limit. By applying the forward neutron tagging technique, we will present the first measurement of incoherent  $J/\psi$  photoproduction cross section as a function of the photon-nucleon center-of-mass energy (40-400 GeV) in PbPb UPCs. Furthermore, we will examine the cross section ratios between incoherent and coherent  $J/\psi$ . Additionally, we will reveal the nuclear suppression factor of incoherent  $J/\psi$  and draw comparisons to the results from coherent  $J/\psi$ . Finally, we will discuss the relevant physics implications of these results.

## Category

Experiment

## Collaboration

CMS

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