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Photoproduction of heavy vector mesons in ultra-peripheral PbPb collisions at center-of-mass energy of 2.76 TeV in CMS

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Ultra-peripheral collisions (UPCs) of heavy ions involve long range electromagnetic interactions at impact parameters larger than twice the nuclear radius. At TeV energies, the strong electromagnetic field due to the coherent action of the $Z=82$ proton charges generates a large flux of photons, which can be used for high-energy photoproduction studies. Heavy vector mesons (for example J/ψ , Ψ' , Upsilon) produced in electromagnetic interactions provide direct information on the parton distribution functions in the nucleus at very low values of Bjorken- x . These events are characterized by a very low hadron multiplicity. The wide pseudorapidity coverage of the CMS detectors is used to separate such events from very peripheral nuclear interactions. The CMS experiment has excellent capabilities for the measurement of the heavy vector mesons in the di-muon decay channel using the tracker and the muon chambers. This analysis is based on the full 2011 PbPb data set of 150/ub. Ultra-peripheral events where one nucleus breaks up are tagged by forward neutrons detected in the Zero Degree Calorimeters. In this talk ratios of Ψ' to J/ψ , and the yields of J/ψ and Ψ' per UPC event with nuclear breakup will be presented and compared to theoretical predictions.

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