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J/ψ photoproduction and the production of dileptons via photon-photon interactions in hadronic Pb–Pb collisions measured with ALICE

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Photon-photon and photonuclear reactions are induced by the strong electromagnetic field generated by ultra-relativistic heavy-ion collisions. These processes have been extensively studied in ultra-peripheral collisions with impact parameters larger than twice the nuclear radius. Since a few years, both the photoproduction of the J/ψ vector meson and the production of dileptons via photon-photon interactions have been observed in A–A collisions with nuclear overlap. Photoproduced quarkonia can probe the nuclear gluon distributions at low Bjorken-x, while the continuum dilepton production could be used to further map the electromagnetic fields produced in heavy-ion collisions and to study possible induced or final state effects in overlapping hadronic interactions.

Both measurements are complementary to constrain the theory behind photon induced reactions in A–A collisions with nuclear overlap and the potential interaction of the measured probes with the formed and fast-expanding QGP medium. In this presentation, measurements of coherent J/ψ photoproduction cross sections in Pb-Pb collisions in the 40%-90% centrality range, measured at midrapidity in the dielectron channel with ALICE will be presented for the first time using the full Run 2 data. Thanks to the excellent tracking resolution of the TPC, the transverse momentum distribution of coherently photoproduced J/ψ can be accurately measured. Final results on coherent J/ψ photoproduction cross-sections at forward rapidity in the dimuon decay channel in the 30-90% centrality range will also be shown. Finally, the measurement of an excess in the midrapidity dielectron yield at low mass and p_T, in the centrality interval 50-90% will be shown. Results will be compared with available models.

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