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Photoproduction of J/ψ and dileptons in events with nuclear overlap with ALICE

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Photon-photon reactions and the production of the J/ψ meson through photonuclear reactions have been extensively studied in ultra-peripheral heavy-ion collisions, in which the impact parameter is larger than twice the nuclear radius. In recent years, coherently photoproduced J/ψ and dilepton production via photon-photon interactions have also been observed in nucleus-nucleus (A-A) collisions with nuclear overlap. Such quarkonium measurements can help to constrain the nuclear gluon distributions at low Bjorken-x and high energy, while the continuum dilepton production could be used to further map the electromagnetic fields produced in heavy-ion collisions. In addition, these measurements can shed light on the theory behind photon-induced reactions in A-A collisions with nuclear overlap, including possible interactions of the measured probes with the formed and fast expanding quark-gluon plasma. Furthermore, the produced quarkonium is expected to keep the polarization of the incoming photon due to s-channel helicity conservation. Thus, in order to confirm the photoproduction origin of the very low-pT J/ ψ yield excess, polarization measurement is an important observable. The ALICE detector can perform quarkonium production measurements at both mid (|y| < 0.9) and forward (2.5 < y < 4) rapidities down to pT = 0. In this presentation, the new ALICE measurements of the J/ψ y-differential cross section and the first polarization results of coherently photoproduced J/ψ via the dimuon decay channel at forward rapidity in Pb-Pb collisions at sqrt(sNN) = 5.02 TeV are reported. Additionally, the measurement of an excess with respect to expectations from hadronic production in the dielectron yield, at low mass and pT, at midrapidity in Pb-Pb collisions at sqrt(sNN) = 5.02 TeV is presented. The results are compared with available theoretical models.

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