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Looking for QGP signatures in ultraperipheral PbPb collisions

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Ultraperipheral collisions of relativistic heavy ion beams lead to a diverse set of photon-nucleus (photonuclear) interactions. The measurements of particle production in photonuclear reactions can shed light on the QCD dynamics of the novel, extremely asymmetric colliding systems, with energies between those available at RHIC and the LHC. Previous studies by ATLAS indicate significant elliptic and triangular flow coefficients in these events. Thus, it is imperative to check these events for other potential QGP signatures including radial flow, strangeness enhancement, and enhanced baryon/meson production. This talk presents the measurement of charged hadron and identified particle yields (K_S^0 , Λ , and Ξ) in photonuclear collisions using 5.02 TeV Pb+Pb data collected in 2018 by ATLAS. The charged hadron and identified particle yields are presented as a function of pseudorapidity and transverse momentum in different categories of event multiplicity. The results are compared with 5.02 TeV p+Pb data collected in 2016 by ATLAS at the same event multiplicities. The results are also compared with calculations from DPMJET and hydrodynamic-based models. These comparisons enable detailed characterizations of photonuclear collision properties, including the photon energy distribution and whether small QGP droplets may be formed.

Category

Experiment

Collaboration (if applicable)

ATLAS Collaboration

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