Contribution ID: **86** Type: **not specified**

UPC Collectivity measurements

Friday 13 June 2025 11:00 (20 minutes)

Ultraperipheral collisions (UPCs) of relativistic heavy ion beams lead to a diverse set of photon-nucleus (photonuclear) interactions. Measurements of particles produced in photonuclear reactions can shed light on the QCD dynamics of these novel, extremely asymmetric colliding systems, with energies between those available at RHIC and the LHC. Previous studies by ATLAS have characterized γ+Pb photonuclear collisions through inclusive charged hadron measurements [1], and have observed elliptic and triangular flow coefficients in these events [2]. Previous studies by CMS have also explored the possibility of the collectivity signals in γ+p interactions [3].

This talk will present the potential formation of collective behavior in photonuclear collisions with a particular emphasis on observables sensitive to radial flow, enhanced baryon-to-meson ratios, and strangeness enhancement. The yields of charged hadrons and, for the first time, identified strange hadrons (K^0_S, Λ, and Ξ) are studied differentially in rapidity, transverse momentum, and event multiplicity. These results utilize high-multiplicity photonuclear collisions using 5.02 TeV Pb+Pb data collected by ATLAS in 2018 and are compared to 5.02 TeV p+Pb ATLAS data from 2016, at the same event multiplicities. Additionally, the findings are compared with calculations from DPMJET and hydrodynamic-based models predicting flow even in these ultraperipheral collisions.

[1] ATLAS Collaboration, "Charged-hadron yield measurements in photo-nuclear collisions using 5.02 TeV Pb+Pb data with ATLAS", https://cds.cern.ch/record/2871729
[2] ATLAS Collaboration, "Two-particle azimuthal correlations in photonuclear ultraperipheral Pb+Pb collisions at 5.02 TeV with ATLAS", Phys. Rev. C 104, 014903 (2021)
[3] CMS Collaboration, "Two-particle azimuthal correlations in γ+p interactions using pPb collisions at 8.16 TeV", Phys. Lett. B 844, 137905 (2023)

Author: DAS, Sruthy Jyothi (University of Illinois at Chicago (US))

Presenter: DAS, Sruthy Jyothi (University of Illinois at Chicago (US))

Session Classification: New directions in UPCs, connection to heavy-ion physics, and synergies with EIC and other facilities

Track Classification: New directions in UPCs, connection to heavy-ion physics, and synergies with EIC and other facilities