Contribution ID: **23** Type: **oral**

Two-particle azimuthal correlations in photo-nuclear ultra-peripheral Pb+Pb collisions at 5.02˜TeV with ATLAS

Monday 11 January 2021 18:40 (20 minutes)

The ultra-peripheral collisions (UPCs) of relativistic heavy ion beams lead to a diverse set of photon-nucleus interactions. The measurements of particles and their interaction produced in photo-nuclear reactions can shed light on the QCD dynamics of novel, extremely asymmetric colliding systems, with energies between those available at RHIC and the LHC. Understanding the hadronic fluctuation spectrum of the photon in this fashion is also critical for maximizing the precision of measurements at a future Electron Ion Collider facility. This talk presents a measurement of two-particle long-range azimuthal correlations in photo-nuclear collisions using $1.73\tilde{}\mathrm{nb}^{-1}$ of $5.02\tilde{}\mathrm{TeV}\tilde{}$Pb+Pb data collected in 2018 by ATLAS with a dedicated photo-nuclear event trigger. Candidate photo-nuclear events are selected using a combination of the single-sided zero-degree calorimeter activity and reconstructed pseudorapidity gaps constructed from calorimeter clusters and charged-particle tracks. Correlation functions are constructed using charged-particle tracks, separated in pseudorapidity. A template fitting procedure is utilized to subtract the non-flow contribution. Elliptic and triangular flow coefficients are presented as a function of charged-particle multiplicity and transverse momentum, and significant non-zero values of the flow coefficients are observed. The results are compared to flow coefficients obtained in proton–proton and proton–lead collisions in similar multiplicity ranges.

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Session Classification: CGC

Track Classification: Physics at low-x and gluon saturation