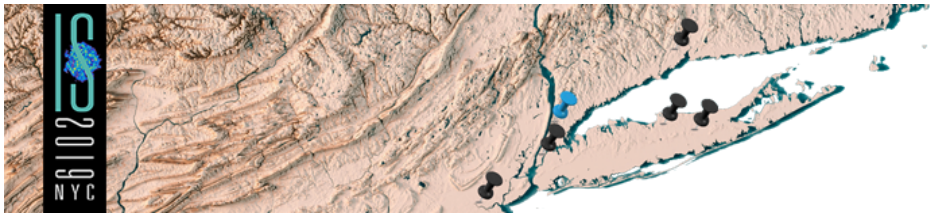

Contribution ID: **16** Type: **Oral**

Recent ATLAS results on correlations in small collisions systems and photon-induced processes in ultra-peripheral Pb+Pb collisions at 5.02 TeV

Wednesday, June 26, 2019 3:00 PM (20 minutes)

This talk presents ATLAS measurements of azimuthal anisotropies in pp and p+Pb collisions, performed via two-, four- and six-particle correlations, with modifications to ensure suppression of correlations arising from jets and dijets. In pp collisions, the strength of the correlations quantified by the anisotropy parameter v_2 does not show any dependence on the charged-particle multiplicity. Recent theoretical models suggest that this can be due to lack of correlation between the charged-particle multiplicity and the impact parameter of the pp collision. To test this hypothesis, correlation measurements are performed in pp collisions tagged by the presence of a Z boson – which acts as an independent handle on the impact parameter – and compared to inclusive pp collisions. Additionally, results of correlations between flow harmonics of different order in pp and p+Pb collisions measured via symmetric and asymmetric cumulants are also presented, and are shown to follow similar trends as those observed in Pb+Pb collisions. Measurements of HBT radii with respect to the second-order event-plane in p+Pb collisions are also presented. Azimuthal modulations in the HBT radii consistent with the hydrodynamic evolution of a short-lived medium are observed. The ultra-peripheral collisions (UPCs) of relativistic heavy ion beams lead to both photon-nucleus and photon-photon processes. The measurements of particle production 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. Finally, new measurements of light-by-light scattering with substantially reduced uncertainties will be presented in this talk. This process provides a precise and unique opportunity to investigate extensions to the Standard Model such as higher-dimension operators and axion-like particles.

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