Contribution ID: **60** Type: **Contributed Talk**

Recent ATLAS measurements of correlations in pp and p+Pb collisions

Thursday, March 26, 2020 10:06 AM (22 minutes)

This talk presents multiple recent ATLAS measurements form the ATLAS collaboration that study features of the azimuthal distributions for charged particles in pp and p+Pb collisions. The measurement of the azimuthal anisotropy of charged hadrons in p+Pb collisions up to a transverse momentum of 50 GeV are presented. In A+A collisions non-zero flow coefficients at high-p_T are understood to arise from the path-length dependent energy loss of jets. Thus, these measurements in p+Pb collisions can provide information on the origin of these collective phenomena. To further assess properties of the azimuthal anisotropy in p+Pb collisions, the correlation between the mean transverse momentum and the magnitudes of the flow harmonics is also measured. The measurements are performed in 5.02 TeV p+Pb collisions for several intervals of the charge particle transverse momentum and as a function of the event-multiplicity. The measured correlations are compared to similar measurements in Pb+Pb collisions.

Measurements of correlations in ultra-peripheral Pb+Pb collisions, in which the nuclei do not interact hadronically, but a quasi-real photon from the EM field of one nucleus can interact with the other nucleus are also presented. These photons may reach energies up to 80 GeV and readily fluctuate into vector-meson configurations, resulting in these collisions effectively being vector-meson+Pb collisions.

Prior measurements of two-particle correlations in pp collisions have demonstrated long-range azimuthal correlations between charged particle pairs. The impact-parameter dependence of these correlations are studied in events containing a Z-boson, which acts as an independent handle on the impact parameter of the pp collision. Measurements of the p_T and event-multiplicity dependence of the azimuthal anisotropy in such Z-tagged pp collisions at 8 and 13 TeV are also presented. Measurements of the azimuthal anisotropy of muons from heavy-flavor decays in pp collisions at 13 TeV, which may further elucidate the origin of these correlations in pp collisions, are also presented.

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Session Classification: QCD with Heavy Flavors and Hadronic Final States

Track Classification: QCD with Heavy Flavors and Hadronic Final States