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## Recent ATLAS measurements of correlations from small to large collision systems

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Measurements of two-particle correlations in  $pp$  collisions show features that are strikingly similar to those seen in heavy-ion collisions, suggesting that a tiny droplet of the QGP is produced even in such collisions. In the  $pp$  collisions models that attribute the correlations to semi-hard processes can also qualitatively reproduce the measurements. In this talk, we report on a series of ATLAS measurements exploring detailed properties of flow in small, medium, and large collision systems.

New ATLAS measurements of two-particle correlations with active selection on particles associated with jets from the event are performed to elucidate the origin of the long-range correlations. If the correlations are indeed generated by semi-hard processes, then the long-range correlations between particles associated with jets would be stronger than the inclusive hadron correlations, while removing jet-associated particles would weaken the correlations.

Additionally, measurements of the azimuthal anisotropy in  $p+Pb$  collisions reaching the transverse momentum of charged particles up to 50 GeV, in minimum-bias and jet-triggered events are presented. In the jet-triggered events,  $v_2$  is non-zero over the entire kinematic range of the measurement, and is  $\approx 2\text{-}3\%$  at  $p_T \approx 50$  GeV.

In large collision systems, we focus on understanding the longitudinal structure of the initial-state in heavy-ion collisions as a key for modeling the early-time dynamics. This talk presents results of flow decorrelations in Xe+Xe and Pb+Pb collisions.

In  $AA$  collisions, the decorrelations for  $v_2$  show a strong centrality and  $p_T$  dependence, while no such dependencies are observed for  $v_3$  and  $v_4$  decorrelations. Decorrelations in Xe+Xe collisions, when compared to Pb+Pb collisions, are found to be larger for  $v_2$ , but smaller for  $v_3$ . These system-dependent trends are not reproduced in current initial-state models when coupled with hydrodynamic evolution.

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