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Correlations between flow and transverse momentum in Pb+Pb and Xe+Xe collisions with ATLAS

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Fluctuations of event-wise average transverse momentum ($[p_{\mathrm{T}}]$) and the harmonic flow (v_n) carry important information about initial-state geometry. Collisions of nuclei with large quadrupole deformation are predicted to produce an initial state with enhanced shape and size fluctuations, and result in a non-trivial correlation between v_n and $[p_{\mathrm{T}}]$ in the final state. In particular, the $v_2 - [p_{\mathrm{T}}]$ correlations are predicted to be different between collisions of spherical ^{208}Pb and collisions of deformed ^{129}Xe. This talk present new measurement of $v_n - [p_{\mathrm{T}}]$ correlation in $\sqrt{s_{\mathrm{NN}}} = 5.44$ TeV Xe+Xe collisions and compared with Pb+Pb at $\sqrt{s_{\mathrm{NN}}} = 5.02$ TeV TeV for harmonics $n = 2$, 3 and 4. The correlation strength is found to depend strongly on the centrality and also on the choice of transverse momentum range of the particles for all harmonics. Comparison with theoretical model calculations is used to shed light on the system-size dependence of this correlation and the influence of deformations. This measurement provides inputs for a better understanding of the initial-state nuclear geometry and dynamics of heavy-ion collisions.

Author: BEHERA, Arabinda (Stony Brook University (US))

Presenter: BEHERA, Arabinda (Stony Brook University (US))

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