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PHENIX results on collective behavior in small systems from geometry-controlled experiments at $\sqrt{s_{NN}} = 200 GeV

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Recent measurements in small collisions systems at LHC and RHIC indicate that the particles produced in high-multiplicity collisions exhibit collective behavior very similar to that observed in large systems where QGP is formed. In large systems, it is well established that the final-state particle correlations arise from anisotropic pressure gradients in the initial state of the collisions that drive a near-perfect fluid evolution. Whether QGP is also formed in small collision systems is presently under intense investigation. To study the origin of the collective behavior in small systems, the PHENIX experiment performed a series of geometry-controlled experiments using p+Al, p+Au, d+Au, and ^{3}He+Au collisions at $\sqrt{s_{NN}}$ = 200 GeV. The elliptic (v_2) and triangular (v_3) flow coefficients are measured as a function of p_T for inclusive and identified charged hadrons. Mass dependence is observed in $v_2(p_T)$ indicative of hydrodynamic evolution. The relation of the v_n strengths and the corresponding initial eccentricities in the different systems is studied and compared to several theoretical predictions that invoke different mechanisms for producing final-state particle correlations. The distinct initial geometries provide discriminating power against the models.

Preferred Track

Collective Dynamics

Collaboration

PHENIX

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