Systematic study of flow harmonics via di-hadron correlations at mid-rapidity in p+Au, d+Au and ^{3}He+Au collisions at $\sqrt{s_{\rm NN}}$ = 200 GeV

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How collectivity originates and evolves in the collisions of small-size systems is a highly debated topic in the heavy-ion community. The evolution may be associated with both hydrodynamic and non-hydrodynamic modes. Furthermore, the uncertainties in the description of initial geometry and fluctuations at the sub-nucleonic scale will significantly degrade the predictive power of the available dynamical evolution models.

In this talk, we will present the measurements of flow harmonics (v_2, v_3) in p+Au, d+Au and ^{3}He+Au collisions at $\sqrt{s_{\rm NN}}$= 200 GeV in STAR. With the advantage of wide rapidity coverage of the Time Projection Chamber (-1< η <1), the flow coefficients are extracted via di-hadron correlations at mid-pseudorapidity with a relative pseudorapidity separation of $|\Delta\eta| > 1.0$. The kinematics of our measurements can help avoid decorrelation and provide a benchmark to compare with boost-invariant models. Such measurements will also provide useful information to understand the effect of nucleonic vs. sub-nucleonic fluctuation on the initial geometry in the small collision systems.