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 uncertaities of initial geometry due to the internal nucleonic structure and its fluctuations will significantly degrade the predictive power of the available dynamical evolution models.

In this talk, we will present 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. Taking the advantage of the wide mid-rapidity coverage of Time Projection Chamber (-1< η <1) in STAR, the flow coefficients are extracted via correlations of di-hadrons both in the mid-rapidity and $|\Delta\eta| > 1.0$. It will avoid the longitudinal dynamics contribution and provide crucial apples-to-apples comparisons with available model calculations, since most of them are boost-invariant. Such measurements will also provide useful information to understand the effect of nucleonic or sub-nucleonic fluctuation on the initial geometry in the small size colliding systems.