

# Measurements of $v_2$ and $v_3$ in p+Au, d+Au and $^3\text{He}+\text{Au}$ collisions at $\sqrt{s_{NN}} = 200$ GeV from STAR

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Large uncertainty for initial geometry eccentricity has been found in small systems. Calculations which include subnucleon structure have been found substantially different with standard Glauber model calculations. This will make it difficult to address the physics origin of long-range angular correlations in small systems, which may come from the initial-state momentum correlations or final-state hydrodynamic flow, or both.

In this poster, we will present the STAR measurement of azimuthal harmonics,  $v_2$  and  $v_3$ , in the p+Au, d+Au and  $^3\text{He}+\text{Au}$  data collected at 200 GeV. The non-flow contributions are studied with several different subtracted methods using p+p collision as a reference. A closure testing with the HIJING and AMPT models are also presented. The  $v_2$  signals are also extracted using four-particle azimuthal correlations and compared with that from two-particle correlation after non-flow subtraction. These results will be compared to calculations from different models and provide new information to address the physics origin of long-range angular correlations. It will also be helpful for model calculation of the initial geometry, as well as to expose possible limitations to the fluid dynamical description of the matter created in these collisions.