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Nuclear structure studies in high-energy ^{96}Ru+^{197}Au and ^{96}Zr+^{197}Au collisions

In heavy-ion collisions, azimuthal anisotropy of the final state clearly reflects the initial geometric configuration. Recent studies have shown that the anisotropic flow v_n values are enhanced by nuclear deformation parameter β_n, especially in ultra-central collisions. In mid-central collisions, the v_n values are also influenced by half-height radius R_0 and nuclear skin a_0. These influences can be well revealed by ratios of observables between two isobaric collision systems, ^{96}Ru+^{96}Ru and ^{96}Zr+^{96}Zr collisions, which have different structures. While compared to isobar collisions, isobar+large nuclei, such as ^{96}Ru+^{197}Au and ^{96}Zr+^{197}Au collisions, provide a clearer approach to studying nuclear structure, as they involve a single elliptical or triangular shape rather than a superposition of two elliptic or triangular patterns. The results suggest even larger v_2 and v_3 difference between the two isobar+Au collisions. The infulence on flow fluctuation will also be discussed. The results can help to understand the nature of the initial state fluctuations and nuclear structure, providing valuable input for future experimental measurements.

Category

Theory

Collaboration (if applicable)

Authors: NIE, Maowu (Shandong University (CN)); CAO, Shanshan (Shandong University); YI, Li (ShanDong University); JIA, Jiangyong (Stony Brook University (US))

Presenter: NIE, Maowu (Shandong University (CN))

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