



Nuclear Theory

Directed, Elliptic and Triangular Flows in Asymmetric Heavy Ion Collisions

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In this paper we propose to thoroughly investigate asymmetric nuclear collisions both in the fixed target mode at the laboratory energy below 5 GeV per nucleon and in the collider mode with a center of mass energy below 11 GeV per nucleon. Using the UrQMD transport model, we demonstrate a strong enhancement of directed and elliptic flow coefficients for the midcentral asymmetric nuclear collisions compared to symmetric collisions. We argue that such an enhancement is due to the disappearance of the nuclear shadowing effect on the side of the smaller projectile nucleus. An analysis of the energy and centrality dependencies of the directed, elliptic and triangular flows at midrapidity shows us their sensitivity to the details of the employed model of hadronic interaction. In general, the flow patterns found for asymmetric nuclear collisions have a very rich and complicated structure of energy and centrality dependencies compared to the flows found for symmetric collisions and are worth to be investigated experimentally. The directed, elliptic, and triangular flow coefficients are computed for target nuclei containing high density fluctuations and thoroughly compared with that ones obtained in the absence of such fluctuations.

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