

Directed, elliptic and triangular flow of free protons and deuterons in Au+Au reactions at 1.23 A GeV

Tuesday 7 May 2019 10:00 (20 minutes)

Recently, the HADES experiment at GSI has provided preliminary data on the directed flow, v_1 elliptic flow, v_2 and triangular flow, v_3 of protons in Au+Au reactions at a beam energy of 1.23 A GeV. Here we present a theoretical discussion of these flow harmonics within the UrQMD transport approach. We show that all flow harmonics, including the triangular flow, provide a consistent picture of the expansion of the system, if potential interactions are taken into account. Cluster formation has a large contribution to the physics of collective flow. Therefore, the flow of deuterons and free protons are compared. Investigating the dependence of the flow harmonics on the nuclear interaction potentials it is shown that especially v_3 can serve as a sensitive probe for the nuclear equation of state at such low energies. The triangular flow and its excitation function with respect to the reaction-plane were calculated for the first time and indicate a complex interplay of the time-evolution of the system and the initial conditions at low beam-energies. Our study also indicates a significant softening of the equation of state at beam energies above $E_{\text{lab}} > 7$ A GeV which can be explored by at the future FAIR facility.

Authors: HILLMANN, Paula; STEINHEIMER, Jan; BLEICHER, Marcus (Uni Frankfurt)

Presenter: HILLMANN, Paula

Track Classification: STARS