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First, second, third and fourth flow harmonics of deuterons and protons in Au+Au reactions at 1.23 A GeV

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We explore the directed, elliptic, triangular and quadrangular flow of deuterons in Au+Au reactions at a beam energy of 1.23 AGeV within the UrQMD approach. These investigations are of direct relevance for the HADES experiment at GSI that has recently presented first data on the flow of light clusters in Au+Au collisions at 1.23 AGeV. To address the deuteron flow, UrQMD has been extended to include deuteron formation by coalescence. We find that this ansatz provides a very good description of the measured deuteron flow data, if a hard equation of state is used for the simulation. In addition we show that light cluster formation has a sizable impact on the proton flow and has to be taken into account to obtain reliable results in the forward/backward region. Based on the observed scaling of the flow, which is a natural result of coalescence, we conclude that deuteron production at GSI energies is a final state recombination effect. Finally, we also discuss the scaling relations of the higher order flow components up to v_4. We show that $v_3 \sim v_1 v_2$ and $v_4 \sim v_2^2$ as function of transverse momentum and that the integrated $v_2^2 \sim v_4$ over the investigated energy range from E_{lab}=0.1 AGeV to 40 AGeV.

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