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Flow correlations as precision tool to measure the Equation-of-State

Correlations between the harmonic flow coefficients v1, v2, v3 and v4 of nucleons in peripheral Au+Au collisions at 1.23A GeV are investigated with the Ultra-relativistic Quantum Molecular Dynamics model employing different Equations-of-State (hard Skyrme, soft Skyrme, Chiral-Mean-Field). Using an event-by-event selection based on the final state it is shown that the triangular flow changes its slope around midrapidity while the quadrangular flow changes its curvature in these different -event classes. The correlations of the flow coefficients are explained with the intricate time dependence of heavy-ion collisions at low collision energies. The results on the flow correlations thus reveal a strong sensitivity to the EoS which will allow to measure the Equation-of-State at large baryon densities more precisely than is usually possible. Finally the model is used to calculate the first and predict the second order flow coefficients of hypernuclei.

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