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Influence of Skyrme-type Momentum Dependent Interaction on HICs Observables

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A new version of the improved quantum molecular dynamics model has been developed by including Skyrme type momentum dependent interaction. Four Skyrme parameter sets, SLy4, SkI2, SkM, *Gs, and 12 kinds of MSL ({K_0, S_0, L, m_s^*, m_v^*}*) parameter sets are adopted in the transport model code to calculate the isospin diffusion, single and double ratios of transverse emitted nucleons, neutron proton isoscaling ratios. The calculations evidence that isospin diffusion observable at lower beam energy is sensitive to the slope of symmetry energy. The high energy neutrons and protons and their ratios from reactions at different incident energies provide a robust observable to study the momentum dependence of symmetry potential, which is related to the nucleon effective mass splitting, at higher beam energy. Furthermore, the covariance analysis are performed to quantify the correlation between the interaction parameters in a transport model and the HIC observables commonly used to extract information of Equation of State in asymmetric nuclear matter.

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