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Dynamical initialization and hydrodynamic modeling of relativistic heavy-ion collisions

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We present a fully three-dimensional model providing initial conditions for energy and conserved charge density distributions in heavy ion collisions at RHIC Beam Energy Scan (BES) collision energies [1,2]. The model includes the dynamical deceleration of participating nucleons or valence quarks. It provides a realistic estimation of the initial baryon stopping during the early stage of collisions. We study various observables obtained directly from the initial state model, including net-baryon rapidity distributions, 2-particle rapidity correlations, and the rapidity decorrelation of the transverse geometry. Their dependence on the model implementation and parameter values is investigated. We also present the implementation of the model with 3+1 dimensional hydrodynamics, which involves the addition of source terms that deposit energy and net-baryon densities produced by the initial state model at proper times greater than the initial time for the hydrodynamic simulation. The importance of this pre-equilibrium stage on hadronic flow observables at the RHIC BES will be quantified.

[1] C. Shen and B. Schenke, "Dynamical initial state model for relativistic heavy-ion collisions", arXiv:1710.00881 [nucl-th].

[2] C. Shen and B. Schenke, "Initial state and hydrodynamic modeling of heavy-ion collisions at RHIC BES energies", arXiv:1711.10544 [nucl-th]

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