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(3+1)D hybrid model of heavy-ion collisions at BES energies with dynamical sources

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At Relativistic Heavy Ion Collider (RHIC) Beam Energy Scan (BES) energies, the dynamics of the pre-equilibrium stage and the effects resulting from a nonzero net baryon current become critical components of the dynamical evolution of the collision fireball. We develop a (3+1)-dimensional hybrid evolution model with dynamical sources for both energy-momentum and the net baryon current. During an initial pre-equilibrium stage based on UrQMD, the four-momenta and baryon numbers carried by secondary particles created within UrQMD are fed continuously, after a short thermalization time, into a (3+1)-dimensional viscous hydrodynamic evolution module. This initialization provides an alternate model to those recently studied by Petersen *et al.* [1] and Shen and Schenke [2]: It thermalizes more rapidly than Ref. [1] and yields a different initial net baryon distribution than Ref. [2]. We present and compare with these previous approaches the dynamical evolution of all thermodynamic and dissipative degrees of freedom, including net baryon diffusion. The sensitivity of experimental observables (spectra and anisotropic flows) to the details of the pre-equilibrium stage and to baryon diffusion will also be demonstrated.

[1] H. Petersen *et al.*, Phys. Rev. C **78**, 044901 (2008).

[2] C. Shen and B. Schenke, arXiv:1710.00881 [nucl-th].

Content type

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Collaboration

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