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Dynamical modeling of the initial energy-momentum and baryon charge distributions for heavy-ion collisions at RHIC Beam Energy Scan energies

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Building upon Ref. [1], we present an improved three-dimensional dynamical initialization model for heavy-ion collisions, implementing local energy-momentum conservation and baryon charge fluctuations at string junctions [2]. These improvements lead to an excellent description of the charged hadron and net proton rapidity distributions in Au+Au collisions from 7.7 to 200 GeV. Based on these results, we quantify the amount of baryon stopping at the initial impact, and baryon transport during the hydrodynamic evolution and hadronic scattering phases. The effects of the finite overlap time at low collision energies on hadronic flow observables are quantified. Keeping all model parameters fixed, we extrapolate our model to asymmetric (p, d, ^{3}He, Cu)+Au collisions at RHIC BES energies. We achieve a good description of the measured particle rapidity distributions for those collision systems, demonstrating our model's predictive power. We present first results on studies of anisotropic flow and net-proton cumulants, relevant for the critical point search.

[1] C. Shen and B. Schenke, "Dynamical initial state model for relativistic heavy-ion collisions,"Phys. Rev. C97 (2018), 024907
[2] D. Kharzeev, "Can gluons trace baryon number?,"Phys. Lett. B 378, 238 (1996)

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