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Parton Cascade Initial Conditions for Event-by-Event Hydrodynamic Modeling at RHIC VIVEK BHATTACHARYA, HANNAH PETERSEN, STEFFEN BASS, Duke University — Relativistic heavy-ion collisions at RHIC are believed to have replicated the state of the early universe by creating a quark- gluon plasma, a deconfined phase of QCD. One of the most interesting findings at RHIC is that the QGP behaves like a near-ideal fluid. As a result, hydrodynamic calculations are used to model the evolution of the QGP, but recent work shows that these calculations are very sensitive to initial conditions (ICs). Common Glauber and Color Glass Condensate ICs are calculated at the start of the collision and do not treat the pre-equilibrium evolution of the system. Here, we improve upon these ICs by employing a Parton Cascade Model, used to describe the evolution of a deconfined system during the early pre-equilibrium phase of the reaction, to accurately evolve the system from the start of the collision to the beginning of hydrodynamic evolution. Furthermore, we adopt a Gaussian smoothing framework to create event-by-event as well as event- averaged ICs. We present various ICs and study the results generated by this hybrid PCM/hydrodynamic model in terms of both average quantities and event-by-event fluctuations.

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