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Pre-hydrodynamic evolution and its signatures in final-state heavy-ion observables TIAGO JOSE NUNES DA SILVA, Univ Federal de Santa Catarina, DAVID CHINELLATO, MAURICIO HIPPERT, WILLIAN SERENONE, JUN TAKAHASHI, Universidade Estadual de Campinas, GABRIEL S. DENICOL, Universidade Federal Fluminense, MATTHEW LUZUM, Universidade de So Paulo, JORGE NORONHA, University of Illinois at Urbana-Champaign
— We investigate the effects of pre-hydrodynamic evolution on final-state observables in heavy-ion collisions, including results in small systems, using state-of-the art event simulations coupled to different pre-hydrodynamic scenarios, which include the recently-developed effective kinetic transport theory evolution model KoMPoST. While we found flow observables to be insensitive to the details of pre-hydrodynamic evolution, we observe an effect in the transverse momentum spectra. We point out that at least part of this effect is a consequence of the underlying conformal invariance assumption currently present in pre-equilibrium approaches, which leads to an artificially large out-of-equilibrium bulk pressure when switching from (conformal) pre-hydrodynamic evolution to hydrodynamics (using the non-conformal QCD equation of state). These results indicate that a consistent treatment of pre-hydrodynamic evolution in heavy-ion collisions requires the use of non-conformal models of early-time dynamics.

Tiago Jose Nunes da Silva
Univ Federal de Santa Catarina

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