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Thermodynamically consistent formulation of quasiparticle viscous hydrodynamics

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We present the derivation of second-order relativistic viscous hydrodynamics from an effective Boltzmann equation for a system consisting of quasiparticles of a single species. We consider temperature-dependent masses of the quasiparticles and devise a thermodynamically-consistent framework to formulate second-order evolution equations for shear and bulk viscous pressure corrections. The main advantage of this formulation is that one can consistently implement realistic equation of state of the medium within the framework of kinetic theory. Specializing to the case of one-dimensional purely-longitudinal boost-invariant expansion, we study the effect of this new formulation on viscous hydrodynamic evolution of strongly-interacting matter formed in relativistic heavy-ion collisions.

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