Abstract Submitted for the OSS15 Meeting of The American Physical Society

Nonconformal viscous anisotropic hydrodynamics DENNIS BAZOW, MAURICIO MARTINEZ, ULRICH HEINZ, Ohio State Univ - Columbus — In relativistic heavy-ion collisions the rapid longitudinal expansion compared to the relatively weaker transverse expansion leads to highly anisotropic local momentum distributions. This breaks the assumption made in canonical viscous hydrodynamics that the system is close to local thermal equilibrium. To account for these large deviations from local momentum isotropy, the one-particle phase-space distribution function is expanded around an anisotropic state rather than its local equilibrium form, using Grad's 14-moment approximation. This procedure leads to the effective macroscopic equations of second-order anisotropic hydrodynamics. We perform a quantitative test of this approximation scheme by applying it to the case of a massive gas undergoing one-dimensional boost-invariant expansion. We use the relaxation time approximation in which case the Boltzmann equation can be solved exactly. We show that the second-order anisotropic hydrodynamics approach significantly outperforms all other hydrodynamic approximation schemes.

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Date submitted: 18 Feb 2015

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