Abstract Submitted
for the APR08 Meeting of
The American Physical Society

Causal Viscous Hydrodynamics in 2+1 Dimensions HUICHAO SONG, Department of Physics, The Ohio State University, Columbus, OH 43210, USA, ULRICH HEINZ, Department of Physics, The Ohio State University, Columbus, OH 43210, USA, CERN, Physics Department, Theory Division, CH-1211 Geneva 23, Switzerland — The viscosity of the QGP is a hotly debated theoretical subject, and first principles calculations are difficult. It is thus important to try to extract the viscosity from experimental data. Viscous hydrodynamics provides a tool that can attack this problem and which may work in regions where ideal hydrodynamics fails. Using the 2nd order Israel-Stewart formulation of (2+1)-dimensional viscous hydrodynamics, we numerically study the effects from shear viscosity on the hydrodynamics evolution of a QGP, the final hadron spectra, and their elliptical flow coefficient v_2, for Cu+Cu collisions at RHIC. It turns out that the elliptic flow v_2 is very sensitive to the QGP shear viscosity, and that even the lowest bound, derived from AdS/CFT conjecture, $\eta/s = 1/4\pi$, leads to a large suppression of v_2. We also explore the scaling behavior of v_2 with the initial source eccentricity ε_x, by computing v_2/ε_x as a function of charged hadron multiplicity in both ideal hydrodynamics and viscous hydrodynamics, comparing Cu+Cu and Au+Au collisions at a variety of impact parameters and collision energies.

Huichao Song
Dept. of Physics, The Ohio State University, Columbus, OH 43210,USA

Date submitted: 26 Dec 2007 Electronic form version 1.4