Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

Anisotropic power-laws in sheared amorphous solids CRAIG MALONEY, CMU; Dept. of Civil and Environmental Engineering, MARK ROBBINS, Johns Hopkins; Dept. of Physics and Astronomy — The local deformation of two-dimensional Lennard-Jones glasses under imposed shear strain is studied via computer simulations. Spatial correlations in the strain field are highly anisotropic and show apparent power-law behavior with a dramatic angular dependence of the effective scaling exponent. The strongest correlations are for wavevectors roughly perpendicular to the line of maximum resolved shear stress with systematic deviations from this which can be understood in terms of a Mohr-Coulomb effect. These results shed light on the nature of the so-called Jamming transition, supporting the notion that the dense steady flowing state is effectively critical in the slow-driving limit, and provide important, testable predictions for experiments on sheared amorphous materials such as bubble rafts, foams, emulsions, granular packings, etc., which can directly access the particle displacements.

Craig Maloney
CMU

Date submitted: 26 Nov 2007

Electronic form version 1.4