Abstract Submitted
for the DFD13 Meeting of
The American Physical Society

Reversible plastic regime in a 2D jammed material[1] NATHAN KEIM, PAULO ARRATIA, University of Pennsylvania — At the microscopic level, flow of a jammed, disordered material consists of a series of particle rearrangements that cannot be reversed. The same material under infinitesimal deformation is free of rearrangements, perfectly reversible, and dominated by elastic stress. Yet several recent studies have found an intermediate regime with observable plastic activity microscopically, but not globally: there is no net change to the material upon reversing the deformation. We report on the occurrence and structure of these reversible plastic events in experiments with an interfacial material, which do not give rise to global irreversibility. Reversible plasticity couples to the bulk shear stress and so contributes to bulk dissipation and viscoplasticity — but this is the case for only a limited range of strain amplitudes below and above the yielding transition.

[1]This work was supported by the Penn NSF MRSEC (DMR-1120901).

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Date submitted: 26 Jul 2013 Electronic form version 1.4