Abstract Submitted
for the DFD12 Meeting of
The American Physical Society

Rearrangements and Rheology in Soft Glassy 2D Material[1]
NATHAN KEIM, PAULO ARRATIA, University of Pennsylvania — We report on simultaneous measurements of shear rheology and microstructure of athermal disordered monolayers of particles ($\sim$6 μm) at an oil-water interface, using an oscillatory magnetic-rod interfacial rheometer. Particle tracking is used to examine the population of dissipative plastic rearrangements that govern mechanical response, and that occur even at small strain. We find that the elastic modulus (G') is approximately 10 times larger than the viscous modulus (G'') at small strains for these soft glassy materials. We describe the statistics of these rearrangements, the growth of viscous dissipation and irreversibility as strain amplitude is increased, and changes in behavior as the system is sheared repeatedly.

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

Nathan Keim
University of Pennsylvania

Date submitted: 02 Aug 2012 Electronic form version 1.4