Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Diffusion in sheared athermal soft-particle suspensions: the role of inertia and dissipation mechanism CRAIG MALONEY, KAMRAN KARIMI, Carnegie Mellon — We perform numerical simulations to study diffusion in a model bi-disperse frictionless athermal soft-particle suspension of disks in two dimensions (2D). To model athermal shear, we damp the motion of a particle *either* with respect to the globally imposed flow *or* with respect to its near neighbors. We study shear flows at various rate $\dot{\gamma}$, system size L, and damping strength b at packing fractions well above the random close packing point. At low $\dot{\gamma}$, we find a quasi-static effective transverse diffusion co-efficient, D_{eff}, which has very weak dependence on ϕ, b, or the damping mechanism yet has a pronounced linear dependence on L in agreement with what is observed in conventional models of bulk metallic glasses. Away from the quasi-static regime, D_{eff} no longer depends on L, and b has a profound impact on the scaling behavior of D_{eff} with $\dot{\gamma}$.

Craig Maloney
Carnegie Mellon

Date submitted: 19 Nov 2011 Electronic form version 1.4