Abstract Submitted
for the DFD15 Meeting of
The American Physical Society

A new state transition in the rheology of dense suspensions RIJAN MAHARJAN, ERIC BROWN, Yale University — Dense suspensions of hard particles are known to have an effective viscosity that diverges as the packing fraction approaches the liquid-solid transition, ϕ_j. This is typically measured based on energy dissipation in a steady state shear flow. In a Newtonian fluid, the same viscosity value also determines how long it takes for a flow to relax to steady state after a change in control. By performing transient flow measurements in a rheometer, we find the transient viscosity of suspensions start to deviate from the steady state viscosity as the packing fraction increases above $\phi_c < \phi_j$. Further, we find the ratio of the normal stress to shear stress reaches a plateau ~ 1 for $\phi > \phi_c$. This identifies a new state transition.

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Date submitted: 30 Jul 2015 Electronic form version 1.4