Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

Local perturbations of dense colloidal suspensions GIANGUIDO C. CIANCI, ERIC R. WEEKS, Department of Physics, Emory University — A rapid temperature quench can transform a liquid into a disordered solid: a glass. We model glassy materials using dense colloidal suspensions, where the transition is induced by increasing the number density rather than decreasing temperature. This transition has drawn significant attention because it poses numerous fundamental questions. For example, close to the glass transition temperature a small decrease in temperature can cause the viscosity of the liquid to increase by 14 orders of magnitude. Meanwhile the structure remains essentially unchanged — there is no growing static length scale accompanying the transition. Fast laser scanning confocal microscopy allows us to directly observe and track thousands of colloidal particles in real time. We add a small number of superparamagnetic colloids in the sample and pull them with an external magnet. The motion of a magnetic probe locally perturbs the dense suspension and highlights its heterogeneous structure. We examine the dependence of the affected region's size on density and applied magnetic force.

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Date submitted: 26 Nov 2007 Electronic form version 1.4