

Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Activated transport, tunable fragility and thermal jamming in microgel suspensions KEN SCHWEIZER, JIAN YANG, University of Illinois @ Urbana-Champaign — Microgels composed of crosslinked polymers are deformable objects of controllable softness that exhibit glassy dynamics that is a highly variable function of suspension volume fraction and single particle modulus. We have developed a microscopic theory for this class of polymer colloids that relates interparticle repulsive forces, structure, elasticity and relaxation. A kinetic arrest diagram is determined in the reduced temperature versus volume fraction plane; no activated dynamics regime is predicted below a critical microgel stiffness or above a critical temperature. As the microgel becomes softer the dynamical slowing down with growing volume fraction increasingly resembles a strong glass former. At fixed concentration, an increase of particle stiffness results in a broad range of dynamic fragilities which partition into two qualitatively different categories. A soft jamming crossover is predicted beyond which local packing order is reduced and the elastic modulus follows a gas-like concentration dependence. Comparison of the theoretical results with recent mechanical and relaxation experiments has been performed.

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Date submitted: 19 Nov 2009

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