Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

**Dynamic arrest of colloids in quenched-disordered nanofiber networks** ANH PHAN, Department of Physics, University of Illinois at Urbana-Champaign, KENNETH SCHWEIZER, Department of Materials Science and Engineering, University of Illinois — The effect of quenched-disordered high aspect ratio nanorod networks on the kinetic arrest of relatively dilute colloid or nanoparticle suspensions is theoretically studied using equilibrium replica integral equation and dynamical activated hopping theories. The adsorbing templates act as an external field which can destroy macrophase separation and induce variable colloidal microstructures. When the colloid-template attraction is weak, a large-mesh network only weakly perturbs dynamical arrest in pores driven by colloid aggregation. Reducing the mesh size increases constraints and enhances colloid localization. For strong interfacial attraction templates, colloids can be kinetically arrested in large-mesh networks even when they are purely repulsive hard spheres due to dynamic blocking effects. However, the localization length is significantly larger, more akin to a glass-like, not gel-like, form of arrest. Decreasing the template mesh results in colloid localization at smaller interfacial attraction strengths. An overall kinetic arrest map is constructed based on the interplay of inter-colloid attraction, colloid-template attraction, and template mesh size. The effect of colloid localization on the composite dynamic elastic shear modulus can be estimated.

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Date submitted: 05 Nov 2015 Electronic form version 1.4