

Abstract Submitted  
for the MAR12 Meeting of  
The American Physical Society

**Confined colloidal suspensions under simple shear** XINLIANG XU, STUART RICE, AARON DINNER, James Franck Institute, University of Chicago — Here we report a study of a simple model system, a colloidal suspension of near hard spheres in an otherwise Newtonian fluid using Stokesian Dynamics (SD) simulations in combination with Non-Equilibrium Umbrella Sampling (NEUS) techniques. The suspension is confined by an external potential in the  $y$  direction and is driven far out of equilibrium with a simple shear flow. At moderate shear rate, the suspension forms layers normal to the flow gradient direction, in contrast to equilibrium. In addition to that, novel anisotropic structures (strings in vorticity direction at low density for example) are observed within each layer. We use Non-Equilibrium Umbrella Sampling to explore the relationship between this string structure and the strength of the layer formation. Furthermore we have also studied the relationship between the non-Newtonian behavior of the suspension and the strength of the layer structure.

Xinliang Xu  
James Franck Institute, University of Chicago

Date submitted: 28 Nov 2011

Electronic form version 1.4