Abstract Submitted
for the MAR05 Meeting of
The American Physical Society

Chains of colloidal platelets in a electric, light and flow fields KUN ZHAO, Princeton University, CHRISTOPHER HARRISON, Schlumberger-Doll Research Center, MATTHEW SULLIVAN, Princeton University, THOMAS MASON, University of California- Los Angeles , WILLIAM RUSSEL, PAUL CHAIKIN, Princeton University — We have used photolithography to produce square, platelike, PMMA colloidal disks of dimension 4.5x4.5x0.7(1.4) microns. In an AC electric field the disks form ribbon-like chains, which at low field are separate and at higher field aggregate as in other electrorheological fluids. Here we report a study on the micromechanics of single chains. We use laser tweezers to hold the midpoint of a chain that is subjected to a transverse viscous flow. The resulting parabolic deformed shape can be used to quantitatively characterize the interactions between disks. Using a dipole-dipole interaction model, we accurately predict the chain deformation and the result allows for evaluation of the effective dielectric contrast between the particles and solvent.

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Date submitted: 01 Dec 2004 Electronic form version 1.4