

Abstract Submitted  
for the DFD12 Meeting of  
The American Physical Society

**Flow-induced structures in polymer-colloid mixtures with attractive interactions** PATRICK UNDERHILL, RANGARAJAN RADHAKRISHNAN, Rensselaer Polytechnic Institute — In some polymeric or surfactant systems, structures can form in flow that would not normally form at equilibrium. This can occur for hydrophobic polyelectrolytes, associative polymers, wormlike micelles, and mixtures of polymers and nanoparticles. These systems are particularly challenging to model because of the separation of time and length scales between the polymer radius of gyration and conformational rearrangements and the scale of the attractive and repulsive interactions. We have developed a new coarse grained model of polymer solutions that show flow-induced structures and have performed Brownian Dynamics simulations. These simulations provide insight into the mechanisms for forming flow-induced structures and the similarities between different systems. We will discuss how the effective solvent quality and balance of attractive and repulsive interactions alter the flow transitions and whether the structures are reversible or irreversible. We have also analyzed the dependence on the flow type. In particular, we have looked at oscillatory shear and elongational flows.

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Date submitted: 02 Aug 2012

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