Abstract Submitted
for the DFD12 Meeting of
The American Physical Society

Fluctuating hydrodynamics for coarse-grained implicit solvent models of soft materials PAUL ATZBERGER, University of California Santa Barbara — Many coarse-grained models have been developed and effectively employed in equilibrium studies of soft materials by treating implicitly interactions mediated by the solvent. These include models for polymeric materials, gels, and lipid bilayer membranes. However, dynamic studies require at a minimum incorporating momentum transfer through the solvent degrees of freedom. Hydrodynamic theories often give a sufficient kinetic description of the solvent mediated coupling of microstructures. In soft materials such theories must be reconciled with thermal fluctuations and entropic effects that play a significant role. In this talk we discuss new approaches based on fluctuating hydrodynamics to incorporate such features into implicit solvent coarse-grained models. For efficient simulations of the solvent-microstructure interactions and thermal fluctuations, we introduce new numerical methods based on the Stochastic Eulerian Lagrangian Method (SELM). We then discuss results for specific coarse-grained models of polymeric fluids, gels, and lipid bilayer membranes.

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Date submitted: 03 Aug 2012 Electronic form version 1.4