Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

Effect of short range hydrodynamic on bimodal colloidal gel systems ARMAN BOROMAND, SAFA JAMALI, JOAO MAIA, Case Western Reserve University — Colloidal Gels and disordered arrested systems has been studied extensively during the past decades. Although, they have found their place in multiple industries such as cosmetic, food and so on, their physical principals are still far beyond being understood. The interplay between different types of interactions from quantum scale, Van der Waals interaction, to short range interactions, depletion interaction, and long range interactions such as electrostatic double layer makes this systems challenging from simulation point of view. Many authors have implemented different simulation techniques such as molecular dynamics (MD) and Brownian dynamics (BD) to capture better picture during phase separation of colloidal system with short range attractive force. However, BD is not capable to include multi-body hydrodynamic interaction and MD is limited by the computational resources and is limited to short time and length scales. In this presentation we used Core-modified dissipative particle dynamics (CM-DPD) with modified depletion potential, as a coarse-grain model, to address the gel formation process in short ranged-attractive colloidal suspensions. Due to the possibility to include and separate short and long ranged-hydrodynamic forces in this method we studied the effect of each of those forces on the final morphology and report one of the controversial question in this field on the effect of hydrodynamics on the cluster formation process on bimodal, soft-hard colloidal mixtures.

Arman Boromand
Case Western Reserve University

Date submitted: 14 Nov 2014 Electronic form version 1.4