Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

Predicting the distribution of functional nanoparticles in block polymers ROBERT RIGGLEMAN, University of Pennsylvania — Polymer nanocomposites continue to find new applications, and it has become clear that controlling the dispersion state of the nanoparticles plays a key role in their ultimate performance. For optical properties it is crucial to control the particle spacing and mutual orientation, while mechanical properties seem to be dictated by the size and shape of any aggregates that form. However, predicting the equilibrium structure and assembly of nanoparticles as a function of their size, shape, surface functionality, and interactions with the matrix polymers remains a significant challenge. In this talk, I will describe our recent efforts to extend polymer field theory to describe the thermodynamics of polymer nanocomposite materials. Our approach does not require the mean-field approximation, and we can describe nanoparticles with a wide range of surface functionality, including grafting with various polymer architectures and strong wetting with a matrix polymer.

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Date submitted: 30 Oct 2014 Electronic form version 1.4