Abstract Submitted
for the MAR09 Meeting of
The American Physical Society

Molecular Weight and Charge Density Asymmetry in Polyelectrolyte Complexation DEBRA AUDUS, GLENN FREDRICKSON, University of California, Santa Barbara, DOMINIK DUECHS, Max Planck Institute, Mainz — We investigate the phase diagram of oppositely charged polymers in a good solvent using a field-theoretic model. Mean-field solutions fail to predict the experimentally observed macroscopic phase separation into a solvent-rich phase and a dense liquid aggregate of polymers - a "complex coacervate." We therefore study the model within a one-loop approximation, which accounts for Gaussian fluctuations in electrostatic and chemical potentials. Our particular focus is the effect of molecular weight, ionic strength, and charge asymmetry on the phase envelope. A set of dimensionless parameters is identified that dictate the size and shape of the two-phase region. Our results should be helpful in guiding experimental studies of coacervation.

Debra Audus
University of California, Santa Barbara

Date submitted: 07 Dec 2008 Electronic form version 1.4