

Abstract Submitted  
for the MAR06 Meeting of  
The American Physical Society

**Universal Aspects of Macromolecules in Polymer Blends, Solutions, and Supercritical Mixtures**<sup>1</sup> YURI MELNICHENKO, Oak Ridge National Laboratory, GEORGE WIGNALL, Oak Ridge National Laboratory, DIETMAR SCHWAHN, Kernforschungsanlage, Jülich — We demonstrate that macromolecules in miscible polymer blends may behave as poor, theta and good polymeric solvents for each other. We construct a conceptual phase diagram, indicating the range of validity of the random phase approximation, outside of which molecules contract or expand beyond their unperturbed dimensions, contrary to common assumptions. Similarly, the concentration fluctuation correlation length collapses onto a master curve for polymeric, liquid and supercritical solvents, indicating that macromolecules behave universally in these media over a wide range of thermodynamic variables.

<sup>1</sup>This work was supported by the Division of Materials Sciences, under Contract No. DE-AC05-00OR22725 with the Oak Ridge National Laboratory, managed by UT-Battelle, LLC.

George Wignall  
Oak Ridge national Laboratory

Date submitted: 30 Nov 2005

Electronic form version 1.4