Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

**Non-Monotonic Concentration Effects in the Phase Behavior and Nematic Orders: Mixtures of Side-Chain Liquid Crystalline Polymers and Low-Molecular-Weight Liquid Crystals**[1] BILIN ZHUANG, ZHEN-GANG WANG, California Institute of Technology — Mixtures of side-chain liquid crystal polymers (SCLCPs) and low-molecular-weight liquid crystals (LMWLCs) are novel materials with applications such as optical data storage, non-linear optics, solid polymer electrolytes, chromatography and display materials. Recent experiments showed that the nematic-isotropic transition temperature and the nematic orders of each component vary non-monotonically with concentration. Existing theories, which combine the Flory-Huggins theory for isotropic mixing and the Maier-Saupe theory for nematic order, cannot explain such non-monotonicity. Here, we extend the existing theories by, first, incorporating the local steric constraints between the side-chain and the polymer backbone on the SCLCPs, and second, accounting for the crowding effects at high SCLCP concentrations. The new extended theory is able to resolve the discrepancies between the predictions of existing theories and the experimental observations.

[1]This work is supported by an A*STAR fellowship.

Bilin Zhuang
California Institute of Technology

Date submitted: 10 Nov 2011 Electronic form version 1.4