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Computational Investigation of Block Copolymer Surfactants for Stabilizing Fluctuation-Induced Polymeric Microemulsions KRIS DELANEY, GLENN FREDRICKSON, UC Santa Barbara — High molecular weight diblock copolymers introduced into a blend of immiscible homopolymers can act as a surfactant to suppress macroscopic two-fluid phase separation. With variation of block copolymer composition, the crossover between low-temperature ordering into microphase or macrophase separated states is marked by a mean-field isotropic Lifshitz multi-critical point. Strong fluctuations close to the Lifshitz point are observed[1,2] to suppress the low-temperature ordering; a microemulsion state emerges, with large, co-continuous domains of segregated fluid lacking any long-range order. We study this phenomenon with fully fluctuating field-theoretic simulations based on complex Langevin sampling, and we attempt to design new block polymer surfactants that can produce the microemulsion state with a wider composition tolerance. [1] Bates et al., PRL 79, 849 (1997) [2] Hillmyer et al., J Phys Chem B 103, 4814 (1999)

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