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Fluctuation Effects in AB/A/B Diblock Copolymer-Homopolymer Ternary Mixtures near the Lamellar-Disorder Transition TIMOTHY GILLARD, ROBERT HICKEY, BRIAN HABERSBERGER, TIMOTHY LODGE, FRANK BATES, University of Minnesota — Fluctuations profoundly influence the phase behavior of block polymer-based soft materials. In ternary blends of an AB diblock copolymer with A- and B-type homopolymers, fluctuations destroy a mean-field predicted higher-order multicritical Lifshitz point and lead to the formation of the technologically important polymeric bicontinuous microemulsion phase (BμE). Here we report a fascinating change in character of the lamellar-to-disorder phase transition as the composition of homopolymer in the ternary blend is increased from zero (neat diblock) to the onset of the BμE channel. As the BμE channel is approached, the transition exhibits increasingly second-order character with the development of large-scale fluctuating smectic correlations in the disordered state near the transition. This change in character of the transition is documented with a combination of scattering, optical transmission, rheology, and TEM experiments in model blends of poly(cyclohexylethylene-*b*-ethylene) with the constituent homopolymers.

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