

Abstract Submitted  
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**Particles vs. Fields – Finite-Range Interactions in Polymer Field Theories** QIANG WANG, Colorado State University — Recently, we proposed a particle-based, fast off-lattice Monte Carlo (FOMC) simulation that uses the same Hamiltonian as in polymer field theories, which has great advantages over conventional molecular simulations. However, the continuous Gaussian chain model and  $\delta$ -function interactions widely used in polymer field theories (such as the self-consistent field theory) cannot be directly used in FOMC simulations. We therefore extend the field theories to the discrete Gaussian chain model and finite-range interactions. Taking the microphase separation of diblock copolymers as an example, a finite interaction range increases the order-disorder transition from the well-known result of  $\chi N \approx 10.5$ , as well as the bulk lamellar period. More importantly, this work allows direct comparisons between the polymer field theories and FOMC simulations without any parameter-fitting to unambiguously and quantitatively reveal the effects of fluctuations and correlations in the system.

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