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Model-specific features of random walk polymers beyond the mean field limit KIRILL TITIEVSKY, Department of Chemical Engineering, MIT — Much of the theory of block copolymers and polymer interfaces is based on infinite molecular weight (mean field) limit of random walk models. In this limit, specific assumptions about an individual monomer – its length distribution and contribution to the density fields – become immaterial, leading to universal behavior. Unfortunately, this assumption is unrealistic for many common systems. Recent field theoretic and explicit chain simulation methods promise to address this problem, but raise an even more fundamental one. With finite chains, we may no longer assume universal behavior and must explicitly analyze the effect of monomer-level representation of a chin on the physical meaning of parameters and global predictions of a random walk model. In this talk, we present key results quantifying the balance between universal and model-specific behavior of common models. The discussion of the fundamental uncertainty of experimental methods used to measure Flory χ parameters will interest experimentalist. Polymer theorists interested in fluctuations corrections to mean field theories will find our results immediately applicable to their work.

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