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Polymer Translocation Dynamics in the Quasi-Static Limit[1]
JAMES POLSON, University of Prince Edward Island — Monte Carlo and Langevin dynamics simulations are used to study the dynamics of polymer translocation through a nanopore using a coarse-grained model. We examine the relationship between the translocation free energy barrier and the translocation times through a comparison of the simulation results to predictions using the Fokker-Planck formalism. We illustrate the importance of using free energy profiles obtained from precise numerical calculations rather than those obtained from simple theoretical models. In addition, we determine the parameter regime within which the Focker-Planck approach is valid and beyond which non-equilibrium effects become appreciable. The relevance of these results to recent theoretical and simulation studies of polymer translocation dynamics is discussed.

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