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Polymer Translocation through a Nanopore Modulated by a Sticky Site HENDRICK W. DE HAAN, GARY W. SLATER, Department of Physics, University of Ottawa — We examine the translocation of a long polymer that has one "sticky site" where a single monomer experiences an attraction to the pore. Using a quasistatic model for the translocation dynamics and employing numerically exact methods to generate results, high precision values for the translocation times are obtained across a wide range of driving forces and sticky site well depths. It is found that the interplay between the sticky site well depth, the driving force, and entropic effects can lead to unexpected results such as a non-monotonic variation of the critical well depth with the driving force and abnormally long translocation times due to the generation of a metastable state at a critical driving force. The dynamics are also found to be strongly dependent on the location of the sticky site: a site near the head of the polymer increases the probability of successful translocation while a site in the middle acts merely as a "speedbump." Treating the sticky site as a perturbation to an otherwise diffusive process (low driving forces) or driven process (high driving forces) yields good agreement with the numerical results.

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