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Driven DNA translocation through thin and long nanopores[1]
ANIKET BHATTACHARYA, WILLIAM H. MORRISON, University of Central Florida — We utilize Brownian dynamics simulation to study polymer translocation through a nanopore driven by an electric field using a coarse-grained bead-spring model for the translocating DNA. We study mean translocation time $\langle\tau\rangle$ as a function of the chain length N, the width w of the pore, and external bias F. Unlike many previous studies, we critically examine the scaling of $\langle\tau\rangle$ as a function of the ratio N/w and F. For a thin pore, our preliminary results indicate that the mean translocation time $\langle\tau\rangle \sim N^{2\nu}$, where ν is the Flory exponent, although the slope shows a weak but non-negligible dependence on the external bias F for the chain lengths considered so far. Our simulation results are consistent with experiments done in solid-state nanopore[*,+].
[*]Work done in collaboration with Heath Morrison, Prof. Kurt Binder and Prof. Andrey Milchev.
[+] A. J. Storm, C. Storm, J. Chen, H. Zandbergen, J-F Joanny, C. Dekker, Nano Letters, **5**, 1193 (2005).

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