Out of Equilibrium Characteristics of a Forced Translocating Chain through a Nanopore\textsuperscript{1} KURT BINDER, Johannes Gutenberg University, ANIKET BHATTACHARYA, University of Central Florida — Polymer translocation through a nano-pore in a thin membrane is studied using Langevin dynamics simulation with a particular emphasis to explore out of equilibrium characteristics of the translocating chain. We analyze the chain conformations both at the cis and the trans side separately. A detail picture of translocation emerges by monitoring the center of mass of the translocating chain, longitudinal and transverse components of the gyration radii and the end-to-end vector. We observe that polymer configurations at the cis side are distinctly different from those at the trans side. During the translocation, and immediately afterwards, different parts of the chain are characterized by a series of effective Flory exponents. We further notice that immediately after the translocation the last set of beads that have just translocated take a relatively compact structure compared to the first set of beads that translocated earlier and the translocation dynamics can be described as a propagating defect. We discuss implications of these results to the theoretical estimates and numerical simulation studies of the translocation exponent reported by various groups.

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