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On the Odijk regime in nanoslits WESLEY REINHART, DOUGLAS TREE, KEVIN DORFMAN, University of Minnesota — The physics of polymer confinement has long been a topic of interest as a fundamental problem in soft matter physics. In biaxial confinement such as a tube or channel, there is a well-documented crossover from a regime dominated by flexible polymer blobs to a regime dominated by stiff deflection segments as the confinement length scale becomes much smaller than the persistence length. However, several fundamental questions remain concerning the exact nature of the strongly confined regime in uniaxial confinement in a slit, where the slit height is much smaller than the persistence length of the semiflexible polymer. We have investigated this problem by an off-lattice implementation of a chain-growth Monte Carlo algorithm, the pruned-enriched Rosenbluth method. Using our numerical results, we confirm that there is indeed a regime dominated by deflection segments in slits, and we provide a simple interpretation of the polymer size in this regime. Furthermore, we investigate previous claims in the literature regarding the effect of excluded volume on strongly confined polymers, where we find a connection between the slit geometry and a semiflexible polymer confined to a plane.

Wesley Reinhart
University of Minnesota

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