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Confined polymers in the extended de Gennes regime

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In the "extended de Gennes regime" the problem of describing the conformations of a semiflexible polymer confined to a channel can be mapped onto the weakly self-avoiding random-walk model. For large contour lengths the asymptotically exact solution of this model predicts how the conformational fluctuations of the confined polymer depend upon the channel dimensions and upon the physical properties of the polymer, its effective width and persistence length. The extended de Gennes regime (where the polymer is neither weakly nor strongly confined) has recently been studied intensively experimentally and by means of computer simulations of worm-like chain models. In this talk I explain the mapping, summarise the predictions derived from the exact solution, and compare the predictions to results of computer simulations [Dorfman *et al.*] and experiments [Westerlund *et al.*] of DNA molecules confined to nanochannels. I conclude by summarising open questions. This talk is mainly based on joint work with E. Werner [Phys. Rev. E **90** (2014) 062602].