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Density fluctuations in nanochannel-confined DNA JOSHUA CARPENTER, ALENA KARPUSENKO, CHUNDA ZHOU, SHUANG FANG LIM, JUNHAN PAN, ROBERT RIEHN, Department of Physics, NC State University — The dynamic behavior of a polymer chain in dense solution is typically described within the framework of reptation, which assumes that polymers primarily move along tubes formed by other chains. We have studied the dynamic density fluctuations of single DNA molecules confined to nanofabricated channels that mimic reptation tubes, and found that the classical harmonic spring model yields a satisfactory description. In particular, we have recovered the expected dispersion relationship. By looking at fluctuation amplitudes, we have also found that the description demands a minimum spring length approximately equal to the size of self-avoiding DeGennes blobs.

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