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The Physics of Nanoconfined DNA: Varying Temperature and Ionic Conditions WALTER REISNER[1], ANDERS KRISTENSEN, Danish Technical University, JONAS TEGENFELDT, Dept of Physics Lund University, HENRIK FLYVBJERG, NIELS B. LARSEN, RISØ National Laboratory — Top-down approaches to nanotechnology have the potential to revolutionize biology by making possible the construction of chip-based devices with nanoscale features that can not only detect, separate and analyze single DNA molecules by size but also–it is hoped in the future–actually sequence at the single molecule level. Using electron beam lithography we have fabricated nanochannel devices in fused silica with dimensions on order of 100x100nm and lengths of 100s of micrometers. Both dsDNA and ssDNA molecules, imaged via fluorescence microscopy, are observed to stretch out in these effectively one dimensional systems. We present measurements of the DNA extension as a function of ionic strength. We also demonstrate how the DNA melting transition can be probed in real time by heating the nanochannel extended DNA.

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