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**Fluctuations of DNA Mobility in Nanofluidic Entropic Traps** LINGLING WU, STEPHEN LEVY, Physics Department, Binghamton University — We studied the mobility of DNA molecules driven by an electric field through a nanofluidic device containing a periodic array of deep and shallow regions termed entropic traps. Since the depth of the shallow region is smaller than the DNA equilibrium size, DNA molecules are trapped for a characteristic time and must deform themselves to traverse the boundary between deep and shallow regions. Consistent with previous experimental results, we observed a nonlinear relationship between mobility and electric field strength and that longer DNA molecules have higher mobility. In repeated measurements under seemingly identical conditions we measured fluctuations in the mobility significantly larger than expected from statistical variation. The variation was most pronounced for lower electric field strengths where the trapping time is considerable relative to the drift time. To determine the origin of these fluctuations, we investigated the dependence of the mobility on several variables: DNA concentration, ionic strength, fluorescent dye staining ratio, ionic current, and electroosmotic flow. The mobility fluctuations were not strongly correlated with these variables within the ranges in which they were varied.

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