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Convex Lens-Induced Nanoscale Templating DANIEL BERARD, FRANCOIS MICHAUD, CHRISTOPHER MCFAUL, SARA MAHSID, WALTER REISNER, SABRINA LESLIE, Dept. of Physics, McGill University — We demonstrate a new platform, "Convex Lens-Induced Nanoscale Templating" (CLINT), for dynamic manipulation and trapping of single DNA molecules. In the CLINT technique, the curved surface of a convex lens is used to deform a flexible coverslip above a substrate containing embedded nanotopography, creating a nanoscale gap that can be adjusted during an experiment to confine molecules within the embedded nanostructures. Critically, CLINT has the capability of actively transforming a macroscale flow-cell into a nanofluidic device without need for high-temperature direct bonding, leading to ease of sample loading and greater accessibility of the surface. Moreover, as DNA molecules present in the gap will be driven into the embedded topography from above, CLINT eliminates the need for the high pressures or electric fields necessitated by direct bonded nanofluidic devices for loading DNA in the confined structures. To demonstrate the versatility of CLINT, we confine DNA to nanogroove structures, demonstrating DNA nanochannel-based stretching. Using ionic strengths that are in line with typical biological buffers, we have successfully extended DNA in sub 30nm nanochannels, achieving high stretching (90%) that is in good agreement with Odijk deflection theory.

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