Abstract Submitted
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Digital DNA: Physics of DNA in Nanopit Lattices WALTER REISNER, Brown University Dept. of Physics, JONAS TEGENFELDT, Dept Physics / Solid State Physics Lund University, NIELS LARSEN, Biosystems/Polymer Dept. Risø National Laboratory Technical University of Denmark, HENRIK FLYVBJERG, Biosystems Dept. Risø National Laboratory Technical University of Denmark, DEREK STEIN, Dept. of Physics Brown University, ANDERS KRISTENSEN, MIC - Department of Micro and Nanotechnology Technical University of Denmark — Controlling the on-chip organization and conformation of DNA is important for a number of interrelated nanotechnology disciplines. We introduce a new type of nanostructure consisting of a nanoslit with a built in spatial modulation of confinement created by arrays of embedded nanopits. Nanopits are square depressions in a 50-100 nm deep nanoslit with a width in the range of 100-500 nm and a depth of 100 nm. A DNA molecule placed in a nanopit lattice will spontaneously adopt a 'digitized' conformation consisting of filled nanopits connected by fluctuating linkers. By adjusting the spacing, organization and placement of the nanopits it is possible to immobilize DNA at predetermined regions of device without additional chemical modification and achieve a high degree of control over local DNA conformation. We will present results from fluorescence microscopy experiments on the equilibrium behavior and dynamics of DNA in such structures and interpret these results in terms of a simple statistical mechanical model.

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