

Abstract Submitted  
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**Nano-plumbing with two-dimensional metamaterials** SAROJ DANGI, ROBERT RIEHN, North Carolina State University — It is well known that if a DNA molecule is confined to a nanochannel of size less than the radius of gyration of the molecule, the entropy of the molecule is lowered and it is forced to stretch at equilibrium. Here we present the transport of DNA molecules in two dimensional metamaterials which are made up of symmetric lattices formed by intersecting arrays of nanochannels. In this study, we introduce a hexagonal unit cell with asymmetries in channel widths, where some channels are flow free. We demonstrate a DNA concentrator and a structure for buffer exchange of a single molecule. The mechanism will be explained as a combination of flow forces and confinement energies, that can be independently set within the device.

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