

Abstract Submitted
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Do Ions Flow Freely Through Confined DNA? ZUBAIR AZAD, ROBERT RIEHN, North Carolina State University — Double-stranded DNA in an aqueous solution is characterized by a strongly localized counter-ion cloud. Classical experiments have shown that the mobility of large DNA coils is independent of the number of basepairs, leading to an interpretation that the molecule can be understood as a collection of segments with constant mobility whose interactions are effectively screened from each other. This “free-draining” assumption posits that DNA and other electrolytes will not influence each other’s mobility. In this talk, we call this assumption into question when the local concentration of DNA is increased beyond that of a self-avoiding random walk by nanoconfinement. We present translocation of DNA and fluorescent tracer ions under established chemical gradients, pressure-driven flow, and electrophoresis in nanochannels with cross sections that are 100 nm x 100 nm. We present evidence that interactions between the DNA and ionic tracers are a non-linear function of the applied fields.

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