Abstract Submitted
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Probing the Influence of Coil Configuration on DNA Translocation Dynamics in Solid-State Nanopores[1] XU LIU, KARRI DIPETRILLO, JASON CHAN, LUCAS EGGERS, ANGUS MCMULLEN, DEREK STEIN, Brown University — We studied electrophoretic DNA translocations of asymmetric nanopore-cavity structures designed to control the initial configurations of molecules. The structures comprise a thin SiN membrane with a nanopore that leads into a 400 nm-high cavity, which is in turn covered by a 400-nm thick SiN membrane with a circular opening whose diameter ranged from 150 nm to 1.5 μm. These structures maintain a gap between the nanopore and a DNA coil translocating from above, but not one translocating from below. The viscous drag on the DNA segment extending from the coil to the nanopore significantly slowed translocations from above. The mean translocation times for those events were 2.5 times longer than for tranlocations from below when the upper opening of the cavity was only 200 nm wide. The translocation times converged as the opening was increased to micrometer diameters. This last result can be explained by the DNA coil, whose radius of gyration is $\sim$600 nm, squeezing into the upper opening by increasing amounts. Our experimental results compare favourably with a quantitative model of DNA translocation speeds, similar to models by Lu *et al.* and by Grosberg, which accounts for the initial configuration of the DNA coil.

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Xu Liu
Brown University

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