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Electrokinetic effects at the edge of silicon supported solid state nanopore membranes RAFAEL MULERO, Mechanical Engineering and Mechanics Department, Drexel University, MOHAMMAD ROBIUL HOSSAN, PRASHANTA DUTTA, Department of Mechanical Engineering, Washington State University, MINJUN KIM, Mechanical Engineering and Mechanics Department, Drexel University — The core motivation of research toward the use of nanopores as electrochemical transducers for genomic sequencing is the potential for rapid sequencing of minimally and inexpensively prepared nucleic acids of great length. Towards this, solid state nanopore arrays are anticipated to be incorporated in the completed solution because of their ability to parallelize the sequencing process resulting in extremely high throughput. Here we experimentally and numerically analyze the electrokinetic effects at the edge of the commonly used silicon supported solid state free standing membrane as a function of membrane chip's material properties and geometry. Experimentally we show regions of localized flow circulation near the edge of the freestanding membrane under commonly used DNA translocation experimental conditions. We investigate the circulation regions through numerical electrohydrodynamic flow simulation and postulate on its possible effect on long strand DNA experiments.

[X] Prefer Oral Session
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