GENERAL PHYSICS

DNA SEQUENCING VIA TRANSLOCATION THROUGH SOLID STATE NANOPORES, Tony D. Schindler[1], Johan Lagerqvist[2], Massimiliano Di Ventra*[2]. Northern Michigan University[1], Marquette, MI 49855, University of California San Diego[2], La Jolla, CA 92093, swilliam@nmu.edu.

Novel methods of sequencing DNA involving the translocation of DNA through solid state nanopores are presently being pursued; these methods could potentially allow for the sequencing of a human genome in minutes. Solid state membranes allow for tightly controlled experiments in which various properties of the DNA can be measured. Some properties are base dependent and could be used for sequencing. Such measurements are highly sensitive to pore geometry and the configuration of the DNA inside the pore. Therefore, more information regarding the translocation process is needed. Classical molecular dynamics were used to investigate the single stranded DNA-nanopore system. DNA conformation inside of the pore and its behavior during translocation were examined; these were found to depend on the field strength and pore geometry. The DNA interacted favorably with the nanopore, hampering its translocation in some cases. Pore shape and dimensions were also probed to find an ideal geometry, one that allowed for ease of entrance and that would yield reproducible measurements.