

Abstract Submitted
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Memory effects in the ion dynamics in nanopores¹ MATT KREMS,
University of California, San Diego, YURIY PERSHIN, University of South Carolina, Columbia, MASSIMILIANO DI VENTRA, University of California, San Diego — We have performed molecular dynamics simulations of ion dynamics across solid-state nanopores subject to a periodic electric field. We have analyzed both the ion build-up at the surfaces of the pores as well as the ion conductivity. Our results show that ion dynamics exhibits memory effects due to both the finite relaxation times of ions in solution as well as the water polarization/depolarization time-scales. These memory effects are reminiscent of the recently proposed memcapacitance (capacitance with memory) features of certain non-linear circuit elements [1], and may have important implications in DNA dynamics and sequencing [2]. [1] M. Di Ventra, Y.V. Pershin and L.O. Chua, Proc. IEEE 97, 1717 (2009). [2] M. Zwolak and M. Di Ventra, Rev. Mod. Phys. 80, 141 (2008).

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