Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Graphene Gating of Solid State Nanopores for DNA Translocation KIMBERLY VENTA, MATTHEW PUSTER, MARIJA DRNDIC, University of Pennsylvania — We report on ionic current measurements through gated solid state nanopores. Devices consist of Si_3N_4 membranes covered with a graphene sheet connected off-membrane to a gold contact pad. The graphene is insulated from solution with a TiO_2 layer deposited by atomic layer deposition, and the gold is exposed by an SF_6 etch. An electron-beam sculpted nanopore below 10 nm in diameter is drilled through the silicon nitride, graphene, and titania. Applying a voltage to the graphene modulates the ionic current through the pore. We measured the current-voltage characteristics for different gate potentials for our devices. We characterized the leakage current from the graphene as well as the ionic current noise in these pores to complement our current-voltage measurements. These results can lead to measurements of the influence on DNA translocation of a potential at the pore and set the groundwork for characterization of graphene-based sensing of DNA at a nanopore.

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Date submitted: 10 Nov 2011 Electronic form version 1.4