Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

**Ion transport barrier in water-filled nanochannels**[1] TOBIAS GULDEN, MICHAEL JANAS, Department of Physics, University of Minnesota, ALEX KAMENEV, Fine Theoretical Physics Institute, Department of Physics, University of Minnesota — In recent experiments great progress was achieved in manipulating and measuring transport of dissolved ions through nanochannels, and several effects were identified which affect the conductance. We seek for a theoretical description of ion transport. A narrow channel may be treated as an effective 1-dimensional statistical system of dissolved ions. This may be mapped onto (in general) non-Hermitian quantum mechanics. We develop its semiclassical treatment by identifying constant energy manifolds as Riemann surfaces in complex phase space. Spectrum and bandwidth can be calculated from the principal actions on this manifold. This brings analytic results for thermodynamic and transport properties of nanofluidic channels, which are in perfect agreement with numerical simulations.

[1]Supported by NSF grant DMR1306734.

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Date submitted: 15 Nov 2013 Electronic form version 1.4