

Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Quantized ionic conductance in nanopores JOHAN LAGERQVIST,
University of California, San Diego, MICHAEL ZWOLAK, Los Alamos National
Laboratory, MASSIMILIANO DI VENTRA, University of California, San Diego
— Ionic transport in nanopores is a fundamentally and technologically important
problem in view of its occurrence in biological processes and its impact on novel
DNA sequencing applications. Using molecular dynamics simulations we show that
ion transport may exhibit strong nonlinearities as a function of the pore radius
reminiscent of the conductance quantization steps as a function of the transverse
cross section of quantum point contacts. In the present case, however, conductance
steps originate from the break up of the hydration layers that form around ions in
aqueous solution. We discuss this phenomenon and the conditions under which it
should be experimentally observable.

Massimiliano Di Ventra
University of California, San Diego

Date submitted: 16 Nov 2009

Electronic form version 1.4