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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.

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