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Angular Distributions of Ions Transmitted by a Nanocapillary Array H.F. KRAUSE, C.R. VANE, F.W. MEYER, Physics Division, Oak Ridge National Laboratory, P.O. Box 2008, Oak Ridge, TN 37831, H.M. CHRISTEN, Condensed Matter Sciences Div., Oak Ridge National Laboratory, P.O. Box 2008, Oak Ridge, TN 37831 — Angular distributions of incident 10–20 keV/q multi-charged ions of Ar and Ne (q=3,7) transmitted in an aluminum oxide nanocapillary array were studied. The diameter and length of the pores are 100 nm and 60 micron, respectively. Charge-state selected angular distributions were obtained. The principal transmitted q-state (incident q-state) is about seven orders of magnitude smaller than the surface porosity (∼30%). The angular distributions, composed of many narrow peaks, can be steered in the longitudinal direction of the nanopores within ∼ ± 1 degrees by rotating the sample with respect to the incident beam. Target tilting experiments prove that the angular structure arises when ions bounce at ultra-low grazing angles in very large impact parameter (>10 nm) Coulomb collisions with electrically charged nanopore walls.\This work was supported by the Division of Chemical Sciences, Office of Basic Energy Sciences, U.S. Department of Energy under Contract No.DE-AC05-00OR22725 with UT-Battelle, LLC.

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