

Abstract Submitted
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Ion Transport in Macrocapillaries¹ LUKE LYLE, State Univ of NY - Buffalo, DHARVA KULKARNI, CHAD SOSOLIK, Clemson University, CLEMSON UNIVERSITY TEAM — We present results on ion transport through large bore capillaries that probe both the geometric and ion-guided aspects of this ion delivery mechanism. The initial observation of ion transport by Stolterfoht [Stolterfoht et al. *Physics Review Letters*, **88**, 13(2002)] through insulating capillaries has sparked interest in possible new, flexible ion beamline designs that would rely on a combination of charge patch formation and external electric field guiding. Implementing such designs will require studies of the underlying physical mechanisms for transport and guiding, both of which are materials-dependent. We demonstrate that guiding in macrocapillaries exhibits position- and angle-dependent transmission directly related to the capillary material and geometry. Specifically, we have passed 1 keV Rb⁺ ions through glass and metal macrocapillaries of varying diameter, and have observed oscillations for ion current passing through the insulating capillaries. Calculations show that these oscillations can be attributed to beam deflections from charge patches that form on the interior walls of the capillary. The absence of these oscillations in the metal capillary data serve as further confirmation of the role of charge patch formation.

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