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**Understanding the Differences between Electron and Ion Guiding** SUSANTA DAS, BUDDHIKA S. DASSANAYAKE, JOHN A. TANIS, Western Michigan University, NIKOLAUS STOLTERFOHT, Helmholtz-Zentrum Berlin, ATOMIC PHYSICS GROUP TEAM — Significant differences in the transmission and guiding of slow positive ions and fast electrons through insulating PET nanocapillary foils have been observed.<sup>1,2</sup> While ions are transmitted without energy loss or change in charge state even when the foil is tilted with respect to the incoming ion beam, electrons undergo inelastic as well as elastic scattering leading to considerable reduction in the transmitted intensities. The underlying reasons for the differences between ions and electrons will be discussed and quantitative comparisons made. Qualitatively, slow positive ions are fully neutralized when striking a surface and consequently deposit all of their charge, whereas electrons can be elastically or inelastically scattered.<sup>3</sup> Additionally, secondary electron emission by incident ions increases the deposited charge, while this same emission decreases the deposited charge for electrons. \*Supported by Research Corporation <sup>1</sup>N. Stolterfoht *et al.*, Phys. Rev. A **77**, 032905 (2008). <sup>2</sup>S. Das *et al.*, Phys. Rev. A **76**, 042716 (2007). <sup>3</sup>B. Stix *et al.*, XXV ICPEAC, Freiburg, Germany, July 2007, Abstracts, MO 128.

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