

Abstract Submitted
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Optimizing Electrostatic Beams Formed from Single-Component Plasmas¹ C.S. SCHALLHORN, J.R. DANIELSON, T.R. WEBER, C.M. SURKO, University of California, San Diego — A non-destructive technique has been developed to create high quality, magnetized electron (or positron) beams using a high magnetic field Penning-Malmberg (PM) trap.² Building on this technique, a class of electrostatic beams was produced by extracting these beams from the guiding magnetic field.³ This procedure involved adiabatic transport of the beam to lower magnetic field, followed by a fast, nonadiabatic extraction to zero field. Once in the zero-field region, the beam was focused with an Einzel lens to small transverse dimensions ($r = 0.12$ cm). We describe further development of this technique using an iron-alloy “spider”⁴ at the field-extraction point to minimize the transverse momentum imparted to the beam particles. Potential uses of the novel electrostatically guided positron beams that can be produced using this technique will be discussed.

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²T. R. Weber, et al., *Phys. Plasmas* **15**, 012106 (2008) and *Phys. Plasmas* **16**, 057105 (2009).

³T. R. Weber, et al., *Phys. Plasmas* **17**, 123507 (2010).

⁴W. Stoeffl, P.Asoka-Kumar, R. Howell, *Appl. Surf. Sci.*, **149**, 1 (2009).

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