

Abstract Submitted  
for the DPP10 Meeting of  
The American Physical Society

**Tailored Electrostatic Beams From Single-Component Plasmas<sup>1</sup>**

TOBIN WEBER, UCSD — A non-destructive technique was recently developed to create high quality, magnetized electron (or positron) beams in a high magnetic field Penning-Malmberg (PM) trap.<sup>2</sup> Expanding upon this technique, a class of electrostatic beams has been produced by extracting these beams from their guiding magnetic field. This procedure involves 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 is focused with an Einzel lens to small transverse dimensions ( $r = 0.12$  cm). Experimental results are presented for beams from a 4.8 T field PM trap. Details of the extraction physics, including the unavoidable velocity kick that the particles suffer upon extraction, are discussed. A generalized beam emittance is introduced to characterize beam quality. Applications and prospects for the future are discussed, including use of a magnetic spoke arrangement to further improve beam quality.

<sup>1</sup>This work is supported by NSF, grant PHY 07-13958.

<sup>2</sup>T. R. Weber, J. R. Danielson and C. M. Surko, Phys. Plasmas **15**, 012106 (2008).

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Date submitted: 13 Jul 2010

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