Abstract Submitted
for the DPP06 Meeting of
The American Physical Society

Plasma Manipulation Techniques for Positron Storage[1] T. R. WEBER, J. R. DANIELSON, C. M. SURKO, University of California, San Diego — Described here are new plasma manipulation techniques central to the development of a multicell Penning trap[2] that is designed to increase positron storage by orders of magnitude (e.g., to particle numbers $N \geq 10^{12}$). The experiments are done using test electron plasmas. A technique is described to move plasmas across the confining magnetic field and dump them at specific radial and azimuthal locations. Techniques to fill and operate two in-line plasma cells simultaneously and use of 1 kV confinement potentials are demonstrated. These experiments establish the capabilities to create, confine, and manipulate plasmas with the parameters required for a multicell trap, namely $N \geq 10^{10}$ in a single cell with temperatures ≤ 0.2 eV, plasma lengths ~ 10 cm and radii ~ 0.2 cm. The updated design of a multicell positron trap for 10^{12} particles is described. Potential applications, including prospects for a portable positron source (i.e., to replace conventional isotope and accelerator-based sources) will be discussed.

[1]This work is supported by DARPA and NSF.
[2]C. M. Surko and R. G. Greaves, *Rad. Phys. Chem.* **68**, 419 (2003).

James Danielson
University of California, San Diego

Date submitted: 21 Jul 2006 Electronic form version 1.4