Abstract Submitted
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**A Multicell Trap for Positron Storage**[1] C.M. SURKO, J.R. DANIELSON, T.R. WEBER, University of California, San Diego — We describe several techniques necessary for the practical implementation of a multicell Penning-Malmberg trap[2,3] designed to increase positron storage by orders of magnitude (e.g., to particle numbers $N \geq 10^{12}$). 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 are deomonstrated to fill and operate two in-line plasma cells simultaneously and to use 1 kV confinement potentials to trap $3\times10^{10}$ particles. These experiments establish the capability 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 $\leq 0.2$ eV, plasma lengths $\sim 10$ cm, and radii $\sim 0.2$ cm. The design of a new structure to test the confinement of plasmas in off-axis cells is presented, as well as an improved design for a multicell positron trap for $10^{12}$ particles. Potential applications, including prospects for a portable positron trap (i.e., to replace conventional isotope and accelerator-based sources) will also be discussed.

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[2]J. R. Danielson *et al.*, Phys. Plasmas **13**, 123502 (2007).
[3]C. M. Surko *et al.*, Rad. Phys. Chem. **68**, 419 (2003).

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