A Multicell trap for Long-term Confinement of Large Numbers of Positrons*

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There are numerous potential applications of high-capacity and/or portable antimatter traps [1]. Previously, we proposed the design for a high-capacity, multicell Penning-Malmberg trap for positrons [1, 2]. Here, we discuss an improved design based on the results of recent experiments [3] to confine and tailor electron plasmas using the “rotating wall” (RW) technique. We are now able to access a regime in which careful tuning of the RW frequency is unnecessary, and transport is insensitive to plasma density and length [3]. Operating a high-capacity, multicell positron trap in this regime offers a number of advantages. The design of a 95-cell trap for $N \geq 1 \times 10^{12}$ positrons will be discussed. Directions for future work, including possible extensions of this design and practical limits on positron accumulation, will be discussed.

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