Abstract Submitted
for the DPP17 Meeting of
The American Physical Society

Positron experiments in a supported dipole trap. J. R. DANIELSON, UCSD, H. SAITOH, J. HORN-STANJA, E. V. STENSON, U. HERGENHAHN, S. NIßL, T. SUNN PEDERSEN, MPI for Plasma Physics, M. R. STONEKING, Lawrence U., M. SINGER, M. DICKMANN, C. HUGENSCHMIDT, TUM, L. SCHWEKHARD, U. of Greifswald, C. M. SURKO, UCSD — A new levitated dipole trap is being designed to experimentally study the unique physics of electron-positron pair plasmas. In parallel with the design process, a number of key questions have been investigated in a supported dipole trap. This includes the use of $E \times B$ drift injection, the manipulation of positron spatial distribution in the trap by external electrostatic potentials, and studies of the positron confinement time in a system with asymmetric perturbations. In particular, $E \times B$ drift injection has been shown to be a viable and robust means of injecting positrons from the NEPOMUC (NEutron-induced POsitron source MUniCh) beam line, across the separatrix, and into the confinement region of the dipole. Nearly 100% injection of the beam has been demonstrated for a large region of parameter space. Once in the trap, positrons can be moved deeper into the confinement region by means of either static or oscillating potentials applied strategically to the segmented outer wall of the trap. Finally, once the injection potentials are switched off, experiments have demonstrated a long-lived component of the trapped positrons lasting for hundreds of milliseconds.

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Date submitted: 14 Jul 2017 Electronic form version 1.4