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Cavity Cooling of Ultracold Highly-Magnetized, One-Component Electron Plasmas ALEX POVILUS, STEVEN CHAPMAN, MARCELO BAQUERO-RUIZ, JOEL FAJANS, University of California, Berkeley — In order to optimize the efficency of recombination processes, it is of interest, particularly for the antihydrogen trapping groups at CERN, to have large numbers (10^6 to 10^8) of ultracold ($\leq$ 10K) electrons and positrons available without the presence of a background buffer gas. To realize this, we utilize the fact that particles in a Penning-Malmberg style trap are typically confined in a 0.8T-3.0T homogeneous background magnetic field and thus can radiate away energy through cycltron motion. Choosing a high-Q trapping cavity with geometry such that electromagnetic cavity modes match the cyclotron frequency of the individual leptons, we can strongly couple the particles to the thermal bath of the cavity walls allowing for quick, passive cooling of the plasma. Here we present the model for this cooling mechanism and a description of the new electron plasma experiment that is being commissioned to study this effect.

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