Abstract Submitted
for the DPP07 Meeting of
The American Physical Society

Photoelectron Plasma for Antiproton Cooling in Antihydrogen Production BENJAMIN LEVITT, Harvard University, ATRAP COLLABORATION — A new photocathode electron source has been developed for antiproton cooling for antihydrogen production in the ATRAP2 Penning trap apparatus. Ten-nanosecond pulses of photoelectrons liberated by intense UV laser pulses from a thin gold layer are captured into a single-component plasma. Up to a billion electrons are accumulated using a series of laser pulses, more than are needed for efficient p cooling. The method is demonstrated within an enclosed vacuum space that is entirely at 4 K, and is thus compatible with the exceptional cryogenic vacuum that is desirable for the long-term storage of antihydrogen. The pitfalls of other electron accumulation methods are entirely avoided, including the particle heating and declining efficiency of field emission point loading, and the heat load and contamination of thermionic emission methods. We also report on other recent ATRAP results, including antiproton stability and antihydrogen production inside a quadrupole Penning-Ioffe trap.

Benjamin Levitt
Harvard University

Date submitted: 13 Sep 2007 Electronic form version 1.4