Abstract Submitted
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Plasma Physics Experiments in Support of Antihydrogen Trapping in ALPHA T.D. THARP, J. FAJANS, U.C. Berkeley, E. PRICE, S. SPELLER, Swansea University, M.P. TOOLEY, University of Manchester and the Cockcroft Institute, ALPHA COLLABORATION — Spectroscopic studies of antihydrogen in ALPHA depend on the reliable production of antihydrogen atoms in quantities large enough to achieve the necessary statistics for precision studies. The efficient production of anti-hydrogen requires the simultaneous trapping of antiproton and positron populations under excellent vacuum conditions with high densities and low temperatures. Presently, we report on recent experiments designed to diagnose and control these three critical elements: (1) A new vacuum diagnostic has been developed in which excited electron plasmas ionize the background gas; the resulting plasma can then be diagnosed to identify the original composition of the gas. (2) Experiments have been performed to characterize plasma compression using electrostatic rotating wall boundary conditions, so that this technique can be optimized for the production of high density plasmas. And (3), a new Lithium ion source has been installed in order to mimic the behavior of antiprotons. This can be used to develop and optimize techniques for the cooling of multi-species plasmas.

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