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Cavity Cooling of Positrons for Anti-Hydrogen Production NATHAN EVETTS, University of British Columbia, ALEX POVILUS, ERIC HUNTER, University of California Berkeley, ISAAC MARTENS, University of British Columbia, JONATHAN WURTELE, University of California Berkeley, WALTER HARDY, University of British Columbia, JOEL FAJANS, University of California Berkeley — Precise spectroscopic measurements of anti-hydrogen at the ALPHA experiment aim to probe the mystery of antimatter asymmetry in our universe. However, these measurements are hindered by small numbers of cold anti-atoms. I will describe a cooling technique for positron plasmas which can be used to increase the number of trappable anti-hydrogen atoms. The technique builds on previous work which allows control of spontaneous emission via the Purcell Effect. Our implementation incorporates a novel microwave resonator into an existing Penning trap to enhance spontaneous emission. Preliminary data suggests that temperatures and cooling rates for these plasmas can be improved by about a factor of 10. Eventually this work could result in an order of magnitude increase in anti-hydrogen production at ALPHA.

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