

Abstract Submitted
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Sympathetic cooling of positrons to cryogenic temperatures.

NIELS MADSEN, Swansea University, ALPHA COLLABORATION — Antihydrogen, the bound state of a positron and an antiproton, is often synthesized by merging cold clouds of positrons and antiprotons. In the more recent techniques, where this is done carefully to allow magnetic trapping of the nascent antihydrogen, the positron temperature dominates both the rate of this process and the temperature of the nascent antihydrogen as the antiprotons thermalize of the positrons before recombination. We have therefore implemented a setup allowing us to load Beryllium ions into our antihydrogen trap system where a near axial laser can be used to laser-cool them. Merging the Beryllium ions with positrons in this setup, we have demonstrated sympathetic cooling of the positrons to below 8 K. The positron number and density, are commensurable with those used for antihydrogen synthesis, but with a temperature now about a factor of three below the temperatures we normally have, a significant increase in antihydrogen trapping when antiprotons become available again is expected.

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