

Abstract Submitted  
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**Evaporative Cooling of Antiprotons to Cryogenic Temperatures in a Penning Trap** EOIN BUTLER, Swansea University, UK, ALPHA COLLABORATION — Evaporative cooling has proven to be an invaluable technique in atomic physics, allowing for the study of effects such as Bose-Einstein condensation. We present the first application of evaporative cooling to charged particles stored in a Penning Trap. We have achieved cooling of a cloud of antiprotons to a temperature as low as 9 K, two orders of magnitude lower than ever directly measured previously [1]. Our measurements are well-described by appropriate rate equations for the temperature and number of particles. The technique has direct application to the ongoing attempts to produce a trapped sample of antihydrogen, where the trap depths are extremely shallow ( $\sim 0.6$  K for ground state atoms).

[1] Andresen, G. B., *et al* (ALPHA), Phys. Rev. Lett. **105**, 013003 (2010)

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