

Abstract Submitted
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Antihydrogen from merged plasmas - not cold enough to trap?

NIELS MADSEN, Department of Physics, University of Aarhus, ATHENA COLLABORATION — The merging of antiprotons with a positron plasma is the predominant and most yielding method for cold antihydrogen formation used to date. We present experimental evidence that this method has serious disadvantages for producing antihydrogen cold enough to be trapped. Antihydrogen is neutral but may be trapped in a magnetic field minimum. However, the depth of such traps are of order 1 K, shallow compared to the kinetic energies in current antihydrogen experiments. Studying the spatial distribution of the antihydrogen emerging from the ATHENA positron plasma we have, by comparison with a simple model, extracted information about the temperature of the antihydrogen formed. We find that antihydrogen is formed before thermal equilibrium is attained between the antiprotons and the positrons, and thus that further positron cooling may not be sufficient for producing antihydrogen cold enough to be trapped.

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