

Antihydrogen production by two stage charge exchange

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Antihydrogen atoms are produced via laser controlled, two stage charge exchange in a cryogenic Penning trap. 5×10^6 antiprotons and 3×10^8 positrons are held in a nested well potential structure. Rydberg Cs atoms travel radially across the trap and through the positron plasma to produce Rydberg Positronium. The Ps^* atoms are produced isotropically, with some atoms moving along the axis of the Penning trap and interacting with the cold antiprotons via a second charge exchange to form potentially very cold antihydrogen. Antihydrogen formation is detected by comparing the antiproton annihilation counts with the Cs excited to the Rydberg state to those obtained when the Cs remains in the ground state.

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