

Antihydrogen formation using a slow merge mixing scheme in ASACUSA's Cusp trap

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The ASACUSA collaboration at CERN plans to measure the ground-state hyperfine structure of a beam of antihydrogen to test CPT. To produce antihydrogen we slowly merged a positron and an antiproton plasma in a Penning-Malmberg trap with a cusped magnetic field. This "smerge" method was pioneered by the ALPHA collaboration. We adjusted the rate at which the potential wells were merged from 0.1 s to 60 s finding that the slowest mixing produced the most antihydrogen. Interrupting mixing at different stages allowed the plasma space charge and radial extent to be determined as a function of time. White noise was used to heat the plasma and we studied the effect of positron temperature on antihydrogen formation.

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