

Abstract Submitted  
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**Antihydrogen Trapping with the ALPHA apparatus** NIELS MADSEN, Physics Department, Swansea University, ALPHA COLLABORATION — Cold antihydrogen was first produced in 2002. Precision comparison of hydrogen and antihydrogen, which remains the ultimate goal of these experiments, promises to be the most precise test yet of the CPT theorem. I.e. that hydrogen and antihydrogen must have the same spectrum at any level of precision. To make such tests possible the ALPHA collaboration have decided that the most promising route is to trap the antihydrogen. We describe the current state of the ALPHA endeavour, as well as the most recent results. One issue is whether magnetic traps, which are the key to trap the neutral antihydrogen are at all compatible with the penning traps used to store the charged species that make up the antiatoms. As quadrupole magnetic fields were at best, badly compatible with our envisaged schemes for antihydrogen, ALPHA uses a magnetic octupole to create the transverse magnetic field minimum necessary to trap antihydrogen. We have demonstrated that charged particles trapped in a superposed penning trap are stable in this field, it remains “only” to demonstrate antihydrogen formation, and ultimately trapping. The main challenge for the trapping seems at present to be that antihydrogen, using the current methods, tends to be formed at temperatures too high to allow trapping. ALPHA is currently working on a number of schemes to overcome this obstacle.

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