

FORMATION OF ANTI-HYDROGEN ATOMS AND IONS IN A STRONGLY
MAGNETIZED PLASMA:
A MOLECULAR DYNAMICS SIMULATION

Daniel Vrinceanu

T-4 Group, MS B283, Los Alamos National Laboratory

Low temperature (4 Kelvin) positrons in a strong magnetic field (5.4 Tesla) of a Penning trap are attached to anti-protons to form anti-hydrogen atoms mainly by three-body recombination. In our simulations 4000 positrons and 1000 anti-protons are confined in a cylindrical geometry. A long time integration (on the order of microseconds) is achieved by using a special adaptive time step symplectic integration scheme. Enough recombination events are observed to allow statistical analysis of various quantities. Besides the neutral antihydrogen atoms, we also observed the formation of antihydrogen positive ions - two positrons simultaneously bind to an antiproton.