

Abstract Submitted
for the DAMOP12 Meeting of
The American Physical Society

Positrons for Antihydrogen with ATRAP: efficient transfer of large positron numbers¹ CODY STORRY, DANIEL COMEAU, ASAF DROR, DANIEL FITZAKERLEY, MATTHEW GEORGE, ERIC HESSELS, MATTHEW WEEL, York University, ATRAP COLLABORATION² — Positrons accumulated in a room-temperature buffer-gas-cooled positron accumulator are efficiently transferred into a superconducting solenoid which houses the ATRAP cryogenic Penning trap for antihydrogen research. The positrons are guided along a 9-meter-long magnetic guide which connects the central field lines of the 0.15-tesla field in the positron accumulator to central magnetic field lines of the superconducting solenoid. Seventy independently-controllable electromagnets are required to overcome the fringing field of the large-bore superconducting solenoid. The guide includes both a 15 degree upward bend and a 105 degree downward bend to account for the orthogonal orientation of the accumulator with respect to the cryogenic Penning trap. Low-energy positrons ejected from the accumulator follow the magnetic field lines within the guide and are transferred into the superconducting solenoid with nearly 100% efficiency. 7 meters of 5-cm-diameter stainless-steel tube, and a 20-mm-long, 1.5-mm-diameter cryogenic pumping restriction ensure that the 10^{-2} mbar pressure in the accumulator is well isolated from the extreme vacuum required in the Penning trap to allow long antimatter storage times.

¹NSERC, CRC, OIT, CFI

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Date submitted: 30 Jan 2012

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