

Abstract Submitted  
for the APR08 Meeting of  
The American Physical Society

**New Concepts and Fermilab Facilities for Antimatter Research**

GERALD JACKSON, Hbar Technologies, LLC — There has long been significant interest in continuing antimatter research at the Fermi National Accelerator Laboratory. Beam kinetic energies ranging from 10 GeV all the way down to the eV scale and below are of interest. There are three physics missions currently being developed: the continuation of charmonium physics utilizing an internal target; atomic physics with in-flight generated antihydrogen atoms; and deceleration to thermal energies and passage of antiprotons through a grating system to determine their gravitation acceleration. Non-physics missions include the study of medical applications, tests of deep-space propulsion concepts, low-risk testing of nuclear fuel elements, and active interrogation for smuggled nuclear materials in support of homeland security. This paper reviews recent beam physics and accelerator technology innovations in the development of methods and new Fermilab facilities for the above missions.

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Date submitted: 11 Jan 2008

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