

Letter of Intent: Antimatter Gravity Experiment (AGE) at Fermilab

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Abstract

We propose to make the first direct measurement of the gravitational acceleration of antimatter by taking advantage of Fermilab's unique ability to accumulate large numbers of antiprotons. Such a measurement will be a fundamental test of gravity in a new regime, directly testing both the equivalence principle and the prediction of General Relativity that matter and antimatter behave identically in the gravitational field of the earth. We propose to decelerate antiprotons in the Main Injector and transfer them into an antihydrogen-production Penning trap. The antihydrogen will emerge from the trap in a low-velocity beam.

¹Also at Muons, Inc.