Abstract Submitted for the TSS13 Meeting of The American Physical Society

Antihydrogen-Gravity Experiment: An Analytical Model For Parallel Plate Geometry<sup>1</sup> J.R ROCHA, CARLOS ORDONEZ, University of North Texas — An analytical model is developed for an experiment that may be used to determine whether antihydrogen falls up or down in Earth's gravitational field. The model is the third iteration of an ongoing development to reduce the experimental run time necessary for an experiment at the CERN Antiproton Decelerator facility. The experiment relies on methods developed by existing research collaborations: production, confinement, and detection of antihydrogen. The configuration consists of two parallel plates that have an axis of symmetry directed away from the center of the Earth. They are separated by a small vertical distance and include a series of circular apertures. An antihydrogen annihilation located a short distance beyond each barrier, within a "shadow" region, are asymmetric on the top or bottom annulus. The analytical model is used to determine the probability that an antiatom annihilates within one of the shadow regions, which would indicate the direction of the acceleration of antihydrogen due to gravity.

<sup>1</sup>This material is based upon work supported by the Department of Energy under Grant No. DE-FG02-06ER54883 and by the National Science Foundation under Grant No. PHY- 1202428.

J.R Rocha University of North Texas

Date submitted: 07 Mar 2013

Electronic form version 1.4