

Abstract Submitted
for the DAMOP18 Meeting of
The American Physical Society

New Apparatus for a Precision Measurement of the Proton Magnetic Moment MASON MARSHALL, KATHRYN MARABLE, ANDRA IONESCU, Harvard Univ, GEEV NAHAL, Northwestern Univ, GERALD GABRIELSE, Harvard Univ — Comparisons of the properties of matter and antimatter particles comprise a precise test of the Standard Model. Specifically, the comparison of the proton and antiproton magnetic moments $\frac{\mu_p}{\mu_{\bar{p}}}$ is a stringent test of CPT invariance in the hadronic sector. In the past few years, work at the CERN Antiproton Decelerator and elsewhere has dramatically improved the precision of this comparison ¹ ². We present the design and initial commissioning results of a new apparatus for a more precise measurement of the proton and antiproton g-factors. Several improvements have been implemented over previous methods, including a cryogenic system for in-situ alignment of the electric and magnetic fields; a redesigned particle trap to improve magnetic field homogeneity; and a new measurement scheme which suppresses systematic uncertainties. This apparatus will initially be used at Harvard and Northwestern for an improved measurement of the proton magnetic moment, after which it will be transferred to CERN for a direct comparison measurement with the antiproton magnetic moment.

¹J. DiSciaccia et al, **Phys. Rev. Lett** 110, 130801

²C. Smorra et al, **Nature** 550, 371

Mason Marshall
Harvard Univ

Date submitted: 07 Feb 2018

Electronic form version 1.4