

Abstract Submitted
for the DAMOP11 Meeting of
The American Physical Society

Progress Toward an Improved Electron g-factor Measurement

J.C. DORR, S. FOGWELL HOOGERHEIDE, G. GABRIELSE, Department of Physics, Harvard University, Cambridge, Massachusetts 02138, USA — The electron g-factor measurement, combined with an independent determination of the fine structure constant, can be used to make the most precise test of quantum electrodynamics (QED). Alternatively, the g-factor measurement can make the most accurate determination of the fine structure constant, if QED is assumed to be valid. The electron g-factor is also key in providing the tightest bound for CPT violation for leptons by comparing the electron and positron g-factors. The previous measurement of the electron g-factor was made with a precision of 0.28 parts per trillion on a single quantum oscillator in a cylindrical penning trap at 100 mK.¹ The uncertainty in the measurement was dominated by lineshape uncertainty. Here we report progress toward an improved electron (and an initial positron) g-factor measurement in a new high stability apparatus within an improved penning trap. These measurements would improve the determination of the fine structure constant and set a new bound on CPT violation in a lepton system.

¹D. Hanneke, S. Fogwell, and G. Gabrielse, Phys. Rev. Lett. 100, 120801 (2008).

J.C. Dorr
Department of Physics, Harvard University,
Cambridge, Massachusetts 02138, USA

Date submitted: 07 Feb 2011

Electronic form version 1.4