

PHYSICS COLLOQUIUM, partially funded by the GSFEL

**Jerry Gabrielse**  
Harvard

**“New Measurement of the Electron Magnetic Moment and the Fine Structure Constant”**

**Monday, 11/13**

4:00 P.M., Ronald Geballe Auditorium, A-102, PAA

Reception at 3:45 P.M. in the lobby



*November 13-17, 2006*

**Abstract:** Remarkably, the famous UW measurement of the electron magnetic moment (chiseled into the walls of the physics building) has stood since 1987. With QED theory, this measurement has determined the accepted value of the fine structure constant.

This colloquium is about a new Harvard measurement of these fundamental constants. The new measurement has an uncertainty that is about six times smaller, and it shifts the values by 1.7 standard deviations. One electron suspended in a Penning trap is used for the new measurement, like in the old measurement. What is different is that the lowest quantum levels of the spin and cyclotron motion are resolved, and the cyclotron as well as spin frequencies are determined using quantum jump spectroscopy. In addition, a 0.1 mK Penning trap that is also a cylindrical microwave cavity is used to control the radiation field, to suppress spontaneous emission by more than a factor of 100, to control cavity shifts, and to eliminate the blackbody photons that otherwise stimulate excitations from the cyclotron ground state. Finally, great signal-to-noise for one-quantum transitions is obtained using electronic feedback to realize the first one-particle self-excited oscillator. The new methods may also allow a million times improved measurement of the 500 times smaller antiproton magnetic moment.

**Monday, 11/13**

**INT Seminar**

Michael Lublinsky, SUNY Stony Brook

10:00 A.M., Rm. C-421, PAT “From Dense-Dilute Duality to Seld-Duality of High Energy QCD”

**Tuesday, 11/14**

**INT Seminar**

Anthony Balz, Brookhaven

10:00 A.M., Rm. C-421, PAT “Ultrapерipheral Lepton Pairs to All Orders in Z Alpha”

**Astrobiology Seminar**

David Deamer, University of California, Santa Cruz

2:30 P.M., Rm. A-118, PAA “Self-Assembly Processes in the Prebiotic Environment”

**Wednesday, 11/15**

**INT Seminar**

Lech Szymanowski, Ecole Polytechnique/SINS, Warsaw

10:00 A.M., Rm. C-421, PAT “Generalizeing the GPDs in Hard Processes: Transition Distribution Amplitudes”

**Nuclear Theory/INT Joint Seminar** Prof. Mark Strikman, Penn State University

2:30 P.M., Rm. C-421, PAT “Short-ranged nucleon-nucleon correlations-looking backward”

**Thursday, 11/16**

**INT Seminar**

Kazutaka Sudoh, KEK

10:00 A.M., Rm. C-421, PAT “Fragmentation Functions”

**Friday, 11/17**

**INT Seminar**

Yuri Kovchegov, Ohio State University

10:00 A.M., Rm. C-421, PAT “Triumvirate of Running Couplings in Small-x Evolution”