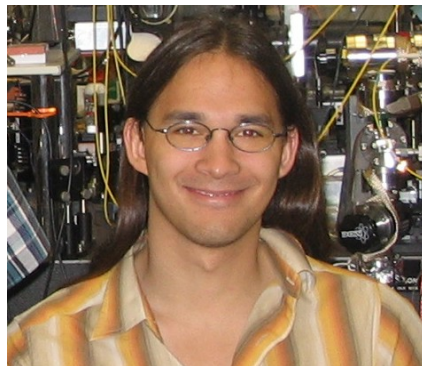


**SEMINAR
OF
THE INSTITUTE FOR QUANTUM INFORMATION SCIENCE**

4:00pm Monday 11 September 2006 in SB 142

Chris Vo
Steven Chu Group - Atomic Physics
Stanford University
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Title: Measuring \hbar/M_{Cs} using atom interferometry

Abstract: We present an atom interferometry experiment to determine the photon recoil shift of the cesium D2-line and thereby the ratio \hbar/M . Here, \hbar is Planck's constant and M the mass of a cesium atom. Knowing \hbar/M to high accuracy is crucial for a determination of the fine structure constant α without involving higher order Quantum Electrodynamical (QED) calculations. Our accuracy goal is 10^{-9} for the relative uncertainty in \hbar/M . This will allow the most precise test of QED and the Standard Model by comparing the resulting value for α with a recent determination based on a measurement of the electron's anomalous magnetic moment. Our setup will use simultaneous conjugate Ramsey-Borde atom interferometers in an atomic fountain. The beam splitters will be implemented by multiphoton Bragg diffractions in standing wave light fields. The talk will focus on the interferometric technique in use and the choice of atom optics. Discussed technical aspects will include a highly phase-stable laser system for the beam splitter pulses and an automatic alignment system for the counterpropagating interferometer beams.

