Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Temporal characterization of electron pulses with 10fs resolution[1]
THOMAS JUFFMANN, GUNNAR E. SKULASON, CATHERINE KEALHOFER, MARK A. KASEVICH, Physics Department, Stanford University, 382 Via Pueblo Mall, Stanford, CA 94305 — Aiming for quantum control of free electrons it is essential to be able to characterize electron pulses in space and time. We are developing an experimental technique that enables the measurement of the temporal profile of an electron pulse with a resolution of about 10fs. A sub 10fs Ti Sapphire oscillator is used to trigger the emission of electrons from a metal tip. The electrons are subsequently accelerated towards an electrode, where they pass through nanometric apertures. Within these apertures, the electrons can interact with evanescent optical fields created with the same Ti Sapphire laser. If the electron pulse and the laser pulse coincide spatially and temporally, their interaction will influence the energy spectrum of the electrons. The temporal cross correlation can then be determined by scanning the time delay between the two laser pulses. We report on the progress of our experimental implementation of this technique, which will be useful in ultrafast electron diffraction experiments.

[1]We thank the Gordon and Betty Moore foundation for financial support.

Thomas Juffmann
Physics Department, Stanford University,
382 Via Pueblo Mall, Stanford, CA 94305

Date submitted: 15 Nov 2013 Electronic form version 1.4