Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Inducing and Probing Attosecond-Time-Scale Electronic Wavefunction Beating[1] CHRISTIAN OTT, PHILIPP RAITH, THOMAS PFEIFER, Max-Planck Institute for Nuclear Physics — Much of the current interest in the field of ultrafast science focuses on the observation of attosecond dynamics of electronic wavepackets. These experiments typically require attosecond pulses either for pumping or probing such dynamics and/or are limited to observing electronic states embedded in the ionization continuum of atoms. Here, we present numerical evidence—based on solutions of the time-dependent Schrödinger equation for a 1-dimensional model atom—that a pump–probe scheme with two few-cycle femtosecond laser pulses provides interferometric access to sub-femtosecond electron wavepacket dynamics. Both continuum- and bound-state electronic wavepacket interference can be simultaneously observed by recording and analyzing time-delay dependent interferences in the ATI spectrum of an atom. Both dipole-allowed and forbidden electronic transition information can be extracted from the data, making this approach a versatile and comprehensive spectroscopic method for probing the bound electronic level structure of an atom.

[1]Acknowledgment: tSNWG grant of the Max-Planck Society (MPG).

Thomas Pfeifer
Max-Planck Institut for Nuclear Physics

Date submitted: 18 Dec 2009 Electronic form version 1.4