Abstract Submitted
for the MAR07 Meeting of
The American Physical Society

A Numerical Study of Pulse-Shape Control of Non-Adiabatic Electron Excitation in the Strong-Field Regime STANLEY SMITH, Temple Uinversity Chemistry Department, XIAOSONG LI, University of Washington Chemistry Department, ALEXEI MARKEVITCH, Temple University Chemistry Department, DMITRI ROMANOV, Temple University Physics Department, H. BERNHARD SCHLEGEL, Wayne State University Chemistry Department, ROBERT LEVIS, Temple University Chemistry Department — The electron optical response of several molecular monocations to short strong-field laser pulses was studied using time-dependent Hartree-Fock theory. In addition to the carrier frequency and maximum amplitude (up to 3.75 x 10^{13} W/cm^2), the short pulses were characterized by pulse shape parameters: the amplitude profile (trapezoidal and gaussian) and the carrier phase shift. The electron response was traced by the evolution of the excited states occupation numbers and by the instantaneous dipole moment of the molecule. In the molecular monocations studied, butadiene, naphthalene, and anthracene, we observed significant modifications in the dipole moment response and in the corresponding excited state spectra, controlled by intensity, frequency, phase, and shape of the laser pulse.

Stanley Smith
Temple University Chemistry Department

Date submitted: 03 Dec 2006 Electronic form version 1.4