Abstract Submitted
for the DAMOP10 Meeting of
The American Physical Society

IR-assisted dissociation of D_2^+ by attosecond XUV radiation P. RANITOVIC, C.W. HOGLE, X. ZHOU, H.C. KAPTEYN, M.M. MURNANE, University of Colorado - JILA — High harmonic generation produces perfectly synchronized attosecond XUV pulses and femtosecond IR pulses that can be combined together to induce and control molecular dissociation. Here, we spectrally select XUV attosecond pulse trains (APT), and use them to coherently populate the ground and excited states of D_2^+ that lie just below the double-ionization threshold. Two time delayed femtosecond IR/UV pulses are then used to control the dissociation processes. Momenta and yields of dissociating ions from different channels are identified and monitored as a function of the phase and time difference between the XUV and IR pulses. When a weak IR field is phase locked with the APT, the total IR field a molecule experiences at the instant of the APT strobe pulses can be modulated 2.5 times, by varying the time delay of a stronger IR field. As a result, the yield of the bound nuclear wave packet rapidly oscillates with the period of the full IR cycle. Photoelectrons are measured in coincidence with the ions using a COTRLIMS technique. Different control mechanisms and applications to larger molecules will be discussed.

Predrag Ranitovic
University of Colorado - JILA

Date submitted: 26 Jan 2010 Electronic form version 1.4