Abstract Submitted
for the DAMOP15 Meeting of
The American Physical Society

Anomalous enhancement and suppression of ionization induced by an effective few-cycle pulse in the frequency domain DAVID FOOTE, YINGDA LIN, WENDELL T. HILL, III, University of Maryland — In a recent set of coherent control experiments, an anomalous sinusoidal variation of the ionization yield was observed in Xe when ionized by a pairs of phase-locked, many-cycle 800 nm pulses. Compared with the signal of a single transform limited pulse, both enhancement and suppression was possible, which depended on the temporal separation and relative phase of the pulses. In the time domain, the control can be viewed as a temporal Young's double slit experiment – two coherent electron wavepackets interfering. In the frequency domain, the photoelectron spectrum is given by the modulus squared of the Fourier transform of the field, which is a few-cycle squared sinusodial function. In analogy to a few-cycle pulse where the carrier phase dictates the ejection direction of rescattered electrons, enhancement (suppression) occurs when the effective carrier waveform is $\cos[w\text{-}w0]^2$ ($\sin[w\text{-}w0]^2$). The contrast decreased with increasing pulse separation and decreasing multiphoton order. Detailed results and a model simulation will be presented.

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Date submitted: 01 Feb 2015 Electronic form version 1.4