

Abstract Submitted  
for the DAMOP07 Meeting of  
The American Physical Society

**Hyperfast time-resolved spectroscopy of electron correlation in excited states** CLEANTHES A. NICOLAIDES, National Technical University, Athens, Greece — As a consequence of continuing developments in the science and technology of techniques that produce and control electromagnetic pulses with frequencies that are found in a broad part of the spectrum, from the ir to the soft X-rays, it is possible to have hyperfast pump-probe time delay spectroscopic techniques capable of time resolving the dynamics of various atomic and molecular systems involving excited states. In this context, it has been demonstrated via first principles solution of the time-dependent Schrödinger equation (TDSE), that effects which are caused by strong electron correlations in excited states, including the process of autoionization and the formation of resonances, can be time-resolved on a time scale of attoseconds [1-3]. By extending the investigations to polyelectronic atoms, we have obtained new results for various time resolved processes associated with the photo-ejection of inner (2s) electrons and of two electrons (LM) from the thirteen electron atom of Aluminum and with the electron correlation beats in bound and autoionizing states of  $N^{+3}$  and Al. The theory and computations account for the interference of direct double ionization, inner hole states and Auger decay [4].

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Date submitted: 10 May 2007

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