

Abstract Submitted  
for the DAMOP08 Meeting of  
The American Physical Society

***Ab initio* exploration of the frequency comb structure and coherence in high-order harmonics of multi-electron systems driven by a sequence of ultrashort laser pulses** JUAN J. CARRERA, SHIH-I CHU<sup>1</sup>, Center for Theoretical Sciences, Dept. of Physics, National Taiwan University, Taipei, Taiwan — We present an *ab initio* nonperturbative investigation of the frequency comb structure and coherence within each order of the high harmonic generation (HHG) of rare gas atoms by means of the self-interaction-free time dependent density functional theory (TDDFT). The time-dependent exchange-correlation potential is constructed by means of the time dependent optimized effective potential (TDOEP) method. The TDOEP equations are solved accurately and efficiently by means of the time-dependent generalized pseudospectral technique. We explore in detail the temporal coherence and robustness of the comb structure by varying the laser pulse duration  $t$ , the number of pulses  $N$ , and the laser intensity. We found that a nested comb structure appears within each order of the harmonics, ranging from the first harmonic all the way to the cut-off harmonic, and this global pattern persists regardless of the values of  $t$  and  $N$  used, and even in the presence of substantial ionization.

<sup>1</sup>Dept. of Chemistry, Univ. of Kansas, Lawrence, Kansas 66045, USA

Juan J. Carrera  
Center for Theoretical Sciences, Dept. of Physics,  
National Taiwan University, Taipei, Taiwan

Date submitted: 28 Jan 2008

Electronic form version 1.4