

Joint CQSE and CASTS Seminar

Weekly Seminar
Jan. 9, 2015 (Friday)

TIME Jan. 9, 2015, 14:30 ~ 15:30
TITLE Exploration of Resonance-Enhanced Coherent VUV generation and Subcycle HHG Dynamics in Intense Ultrashort Laser Fields
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Abstract

In this talk, we briefly address some recent development of theoretical and computational methods and their applications for the nonperturbative treatment of multiphoton processes in intense ultrashort laser pulses. We extend the self-interaction-free (SIF) time-dependent density functional theory (TDDFT) [1, 2], taking into account all the spin-orbitals and electron correlation effects, and demonstrate a new regime of phase-matched below-threshold harmonic generation, for which the generation and phase matching is enabled only near resonance structures of the atomic target [3]. Also, with use of the same SIF-TDDFT method, we studied the subcycle dynamical behavior of the high harmonic generation (HHG) for transitions from the excited states to the ground state of atoms [4]. We uncover the oscillation structures of the harmonic emission with respect to the time delay between the single attosecond pulse (SAP) and near-infrared (NIR) pulse.

- [1] S. I. Chu, *J. Chem. Phys.* **123**, 062207 (2005).
- [2] J. Heslar, D. A. Telnov, and S. I. Chu, *Chinese J. Phys.* **52**, 578 (2014).
- [3] M. Chini, X. Wang, Y. Cheng, H. Wang, Y. Wu, E. Cunningham, P.-C. Li, J. Heslar, D.A. Telnov, S.I. Chu, and Z. Chang, *Nature Photonics* **8**, 437 (2014).
- [4] J. Heslar, D. A. Telnov, and S. I. Chu, *Phys. Rev. A* **89**, 052517 (2014).

