エクストリームフォトニクスセミナー

Extreme Photonics Seminar

No.11

Language: Japanese

Date: Nov. 25th(Thu), 2010, 15:00 〜 17:00

Location: Cooperation Center, 5F Meeting Room, W524

(研究交流棟5階会議室 W524)

Title: Probing time-dependent structure of the attosecond electron wave packet using two-color laser fields

Speaker: **新倉　弘倫　准教授**　(早稲田大学)

Prof. Hiromichi Niikura (Waseda Univ.)

Chemical reactions, photo-ionization and photo-excitation are associated with electron motion or charge-transfer in molecules as well as nuclear motion. Electron tunnelling from multi-electronic states of a molecule by an intense, infrared laser pulse can also create electron wave packet or hole in the molecule. Here we show the time-dependent structure of an electron wave packet moving in the valence-shell of a large molecule in attosecond time-scale. To image the wave packet, we use the correlated continuum electron which is simultaneously produced with the valence electron wave packet by tunnelling.
We measure the high harmonic emission spectra which is caused by the re-collision between the two wave packets. Combining two-color, orthogonally polarized laser pulses, we rock the re-colliding continuum wave packet about the molecule, taking multiple projections of electron (or hole) wave packet for each time that an harmonic is generated. An apparent symmetry jump that occurs midway through the time window measures what the electron wave packet looked like immediately after it was created. First, we show how our approach can distinguish symmetry of the wave function and then we show how the attosecond dynamics can be measured. Our method does not require molecular alignment, making it applicable to complex molecules and decouples ionization from recombination..

Title：Terahertz spectroscopy in solids; from semiconductor to strongly correlated electron system

Speaker：**島野　亮**　准教授　(東京大学)

Prof. Ryo Shimano (Univ. Tokyo)

I will present recent progress of our research on the light-matter interaction in terahertz frequency regime: 1)time-resolved study of phase transition phenomena, such as insulator to metal transition and liquid -gas transition in electron and hole system in semiconductors, 2) photo-induced insulator to metal transition in spin density wave system in a quasi-1D organic conductor, 3) electromagnon, i.e. the electric dipole active magnetic excitation, in multiferroic rare-earth mangnites. Recent development of intense THz light source with peak electric field amplitude of ~1MV/cm and its application to nonperturbative nonlinear optics in solids will also be presented.

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