

エクストリームフォトニクスセミナー  
*Extreme Photonics Seminar*

No. 7

**Date :** Nov.2(Fri), 2012, 15:00 ~ 18:00

**Location :** Cooperation Center, 5F Meeting Room, W524  
(研究交流棟 5階会議室 W524)

*Language: Japanese*

**Title :** Ionization dynamics of atoms and molecules in intense laser fields studied by photoelectron spectroscopy

**Speaker :** 松田 晃孝 氏 (名古屋大学 物質科学国際研究センター)  
Dr. Akitaka Matsuda (RCMS, Nagoya Univ.)

Recent advances in laser technology enabled us to utilize ultrashort laser pulses to generate intense laser fields which electric field strength is comparable to the intra-atomic Coulombic force of hydrogen atoms. Interactions between intense laser fields and molecules have been intensively studied on the basis of nuclear dynamics, while the underlying ionization mechanisms are not yet fully understood. Photoelectron spectra reflect directly the ionization dynamics thus provides valuable clues to understand the interaction between molecules and non-resonant intense laser fields. In the seminar, I would like to present our recent results on the ionization dynamics of Xe and O<sub>2</sub> in intense laser fields studied by multi-electron-ion coincidence spectroscopy using high-resolution magnetic bottle-type photoelectron spectrometer.

*Language: Japanese*

**Title :** Development of short-pulse Yb:YAG lasers

**Speaker :** 松原 伸一 氏 (高輝度光科学研究センター)  
Dr. Shinichi Matsubara (JASRI)

Yb:YAG laser is one of the attractive short-pulse lasers on account of a reliable material or a capacity for LD pumping. The Yb:YAG laser is possible to generate shorter a few picosecond pulses and over 10 W average power with high efficiency. We developed a mode-locked laser that was generated short pulses and a regenerative CPA system that has high average output power and a high-repetition rate. The mode locked laser is constructed from a microchip gain module and a nonlinear medium in the laser cavity in order to obtain strong spectrum broadening. The pulse duration was shorter than theoretical pulse-width from the fluorescence width. The amplifier system employed a thin-rod gain module whose composition is similar to an optical fiber. It is possible to obtain high-gain and high cooling efficiency. In the seminar, these developed Yb:YAG lasers, which are short pulse and high power lasers, are presented.

*Language: English*

**Title :** Transient absorption spectroscopy with isolated attosecond pulses

**Speaker :** 増子 拓紀 氏 (NTT物性科学基礎研究所)  
Dr. Hiroki Mashiko (NTT Basic Research Laboratories)

Laser-dressed absorption was studied by transient absorption spectroscopy using isolated attosecond pulses (~400 as) with 17-24 eV and 7 fs near-infrared (NIR) pulses. The light-induced structures with helium and neon atoms were the intermediate states in resonant, second-order processes that transfer population to multiple dipole forbidden (dark) states. In addition, the light-induced structure gives partially disturbing the polarization of the xenon and mapping a recovery of the absorption line feature on the timescale of the autoionization. The observation that an isolated attosecond pulse accesses multiple light-induced states suggests that the time-dependent polarization can be controlled on an ultrafast time scale.