

ASHIHARA LAB.

[Watching/Controlling Matter with Tailored Light]

Department of Fundamental Engineering

<http://www.ashihara.iis.u-tokyo.ac.jp>

Ultrafast Optics

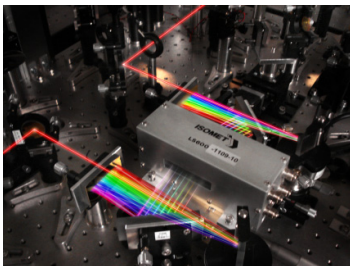
Department of Applied Physics

Watching/Controlling Matter by Tailored Light

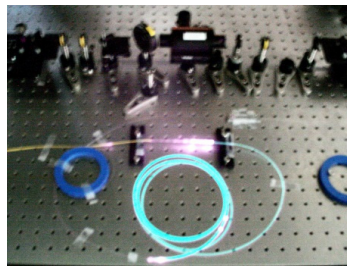
Experimental studies in the field of optical science, especially on ultrafast optics, nano-optics, and spectroscopy. Schemes for controlling ultrashort laser pulses are developed and applied to spectroscopy and coherent controls of molecules and solids.

- (1) Generation and shaping of ultrashort optical pulses
- (2) Quantum mechanical control of condensed-phase matter using optical phase control
- (3) Field enhancements and light-matter interactions in the optical near-field
- (4) Novel infrared spectroscopy (multi-dimensional spectroscopy, nano-spectroscopy)

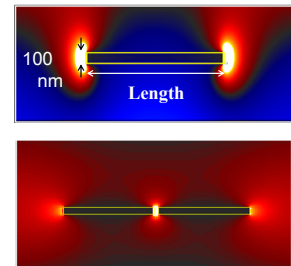
Generation and Shaping of Ultrashort Optical Pulses



Optical synthesizer, generating arbitrary-shaped infrared lightwave

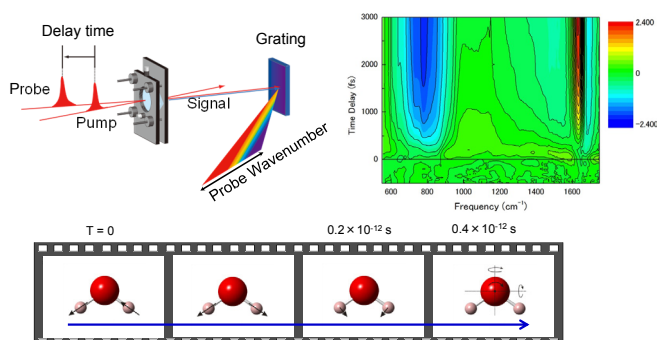


Compact ultrashort-pulsed laser based on optical fiber



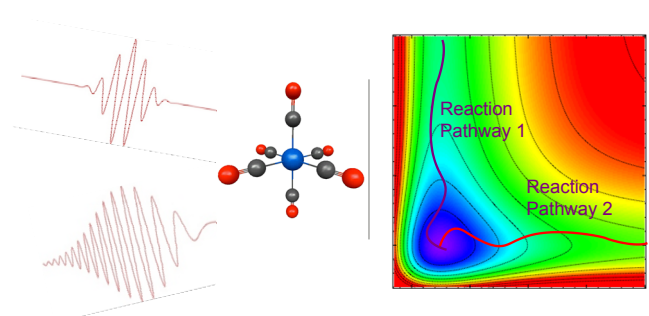
Nano-confinement of infrared field using metal nano-structures

Short-pulse Spectroscopy



Taking the snapshots of molecular structure, energy states, and local environments

Quantum-mechanical Control of Matter



Coherent control of molecular reactions and solid-state phase transitions by tailored light-field.