

# Development of High-Precision Coherent Control and Its Applications

Department of Photo-Molecular Science  
Division of Photo-Molecular Science II



OHMORI, Kenji  
KATSUKI, Hiroyuki  
TAKEI, Nobuyuki  
GOTO, Haruka  
SOMMER, Christian  
NAKAGAWA, Yoshihiro  
KOYASU, Kuniaki  
INAGAKI, Itsuko  
YAMAGAMI, Yukiko

Professor  
Assistant Professor  
Assistant Professor  
Post-Doctoral Fellow  
Post-Doctoral Fellow  
Graduate Student  
Graduate Student  
Secretary  
Secretary

Coherent control is based on manipulation of quantum phases of wave functions. It is a basic scheme of controlling a variety of quantum systems from simple atoms to nanostructures with possible applications to novel quantum technologies such as bond-selective chemistry and quantum computation. Coherent control is thus currently one of the principal subjects of various fields of science and technology such as atomic and molecular physics, solid-state physics, quantum electronics, and information science and technology. One

promising strategy to carry out coherent control is to use coherent light to modulate a matter wave with its optical phase. We have so far developed a high-precision wave-packet interferometry by stabilizing the relative quantum phase of the two molecular wave packets generated by a pair of femtosecond laser pulses on the attosecond time scale. We will apply our high-precision quantum interferometry to gas, liquid, solid, and surface systems to explore and control various quantum phenomena.

### Award

OHMORI, Kenji; Humboldt Research Award (Germany).