# Visiting Professors

Visiting Professor
**KANAI, Kaname** *(from Tokyo University of Science)*

Electronic Structure of Donor and Acceptor Interface in Organic Photovoltaics

It have been reported that microscopic structure at donor and acceptor (D/A) interface in organic photovoltaics has a key impact on the device performance. Especially, it has been believed that mixture inhomogeneity of donor and acceptor molecules at the interface significantly influences the efficiencies of free-charge generation and recombination. However, effects of the mixture inhomogeneity on the D/A interface remains elusive yet. Recently, we have been trying to figure out how the mixture inhomogeneity of donor and acceptor molecules affects the interface electronic structure at the D/A interface using photoemission spectroscopy (PES) at BL2B beamline of the UVSOR synchrotron facility. We found that the relatively strong intermolecular interaction between sexithiophenes (6T) and perfluorinated Cu-phthalocyanines ($F_{16}$CuPc) is key to have disordered molecular arrangements at the D/A interface by STM measurements. Now, we are trying to catch the subtle changes in the energy distribution of the molecular levels of 6T and $F_{16}$CuPc, respectively, in the mixed films using PES compared with isolated 6T and $F_{16}$CuPc's films.

Visiting Associate Professor
**KANEYASU, Tatsuo** *(from SAGA Light Source)*

Generation and Application of Vortex Beams from Synchrotron Light Source

A vortex light beam having a helical wavefront carries orbital angular momentum (OAM) as well as the spin angular momentum associated with its circular polarization. Recently, it was found that the harmonic radiation from a helical undulator carries an OAM. This novel feature of the undulator radiation will allow us to utilize vortex beam at short wavelengths, and may open up new applications in synchrotron radiation research. In exploring new applications of the vortex beams, a fundamental understanding of the role of the OAM in the light-matter interaction is crucial. We have investigated the characteristics of the vortex beam in the extreme ultraviolet (XUV) region and applied it to the photoionization study of rare-gas atoms. To explore the vortex-atom interaction which is hardly observable in the conventional gas-phase experiment, we are developing a new experimental setup based on the combined use of laser and synchrotron light sources. In addition we plan to study the XUV vector beam which has space-varying polarization, and its interaction with atoms.