

Molecular frame photoemission: a sensitive probe of both electronic/nuclear photodynamics *and* the complete polarization state of ionizing light

Molecular frame photoemission is well identified as a powerful mean to characterize the dynamics of photoionization of simple molecules. The vector correlation method developed for this purpose takes advantage of dissociative photoionization (DPI) induced by one photon absorption in the VUV and XUV range. It combines electron-ion coincident momentum spectroscopy on the one hand, and complete data analysis based on the relevant analytical description of the molecular frame angular distribution (MFPAD), on the other hand.

In the seminar, recent extensions of MFPAD studies will be presented such as symmetry breaking of circular dichroism in resonant DPI of H₂ and its isotopes induced by circularly polarized synchrotron radiation, or multiphoton excitation and ionization of NO₂ probed by femtosecond pulses.

Finally, the polarization state of the ionizing light being entirely encoded in the MFPAD e.g., in terms of the Stokes parameters, molecular frame photoemission acts as “molecular polarimetry”. This will be illustrated by recent results in high harmonic spectroscopy obtained in collaboration with the Attophys group at LIDyL combining the laser-driven XUV source (PLFA facility, CEA-Saclay/SLIC) with the electron-ion vector correlation method applied for DPI of the NO molecule using a COLTRIMS set-up.