

Gas Phase Analytical Applications of VUV Coincident Photoelectron Photoion Imaging Techniques

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Amphithéâtre SOLEIL

Since the flurry of discoveries at the turn of the 19th century, photoelectron spectroscopy has been the technique of choice to study electronic structure in condensed and diluted matter. Modern charged particle velocity imaging techniques compatible with the gas phase allow for multiplex acquisition of electron energies and angles and can be naturally coupled to mass spectrometry via photoelectron photoion coincidence (PEPICO) schemes, especially with continuous and tuneable ionization sources such as synchrotron radiation. Here, I show how these methods can be applied in the vacuum ultraviolet energy range to the detection, quantification and characterization of important reactive intermediates and products in gas phase reactions in the fields of atmospheric chemistry, combustion, astrochemistry or catalysis. The methodology can be further expanded to the study of molecular and supramolecular chirality, and even to the quantification of enantiomeric excesses in chiral mixtures through the use of the photoelectron angular information, particularly the photoelectron circular dichroism, a forward/backward asymmetry along the photon propagation direction which arises solely within the electric dipole approximation and as such reaches values high enough to be compatible with gas phase environments. I will present short- and medium-term strategies to improve the current performances of the PEPICO permanent endstation at the DESIRS beamline (synchrotron SOLEIL, France), and the complementarity with laser-based systems, as well as future research avenues on different subjects such as the photoelectric heating of the interstellar medium or the real time detection and characterization of chiral intermediates and products in asymmetric reactions in the gas phase.

Membres du jury :

Danielle DOWEK	Institut des Sciences Moléculaires d'Orsay	Rapportrice
Robert GEORGES	Pr. Université de Rennes	Rapporteur
Cristian FOCSA	Pr. Université de Lille	Rapporteur
Jennifer NOBLE	Laboratoire Physique des Interactions Ioniques et Moléculaires, Marseille	Examinatrice
Roland THISSEN	Institut de Chimie Physique d'Orsay	Examinateur
David TOUBOUL	Laboratoire de chimie moléculaire, École Polytechnique, Palaiseau	Examinateur



Vous êtes cordialement invités au pot qui suivra

Formalités d'entrée : accès libre dans l'amphi du pavillon d'Accueil.

Si la manifestation a lieu dans le Grand Amphi SOLEIL du Bâtiment Central merci de vous munir d'une pièce d'identité (à échanger à l'accueil contre un badge d'accès).

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