



## POST DOCTORAL RESEARCH ASSISTANT

**TITLE:** Studies of ultrafast molecular processes by multiparticle imaging techniques  
**Keywords:** molecular dissociation, momentum spectroscopy, COLTRIMS  
**Location:** Laboratoire de Chimie Physique Matière et Rayonnement, Université Pierre et Marie Curie, Sorbonne Universités, 11 rue Pierre et Marie Curie 75005 Paris, France.  
**Duration:** 24 months  
**Funding:** ANR-DFG grant  
**Salary:** 3000€  
**Mentors:** Marc Simon (marc.simon@upmc.fr), Renaud Guillemin (renaud.guillemin@upmc.fr)

**Research project:** How are molecular orbitals formed from the atomic orbitals of the constituencies when a chemical bond is formed or inversely how do the atomic orbitals emerge from the molecular ones if a bond breaks? A collaborative project, led by M. Simon in Paris and R. Dörner in Frankfurt, aims to make a major contribution towards answering this question. Synchrotron radiation will be used to core excite a molecule to a steeply repulsive dissociating potential energy curve and use the Auger electrons which are emitted during the dissociation as a probe providing the most detailed information of the evolution of the internuclear distances and the shape of the transient orbitals at the instant of their decay. Energy and direction of the Auger electrons and fragment ions will be imaged in coincidence, as well as photon and fragment ions. With this approach, an unprecedented combination of time (core hole clock), spectral (narrow band width synchrotron) and spatial information (Auger electron diffraction) will be obtained.

**Job description:** Based at LCPMR, the post-doctoral research assistant will be in charge of developing and operating a new photon/ion coincidence spectrometer for synchrotron based experiments. She/he is expected to plan and conduct the experiments (at SOLEIL in France, and BESSY in Germany), collect and analyze the spectroscopic data. She/he will interact with an international theory team providing experimental and theoretical support and make a significant contribution to the field.

**Requirements:** We welcome applications from excellent candidates with a PhD degree (or who are about to obtain one) in atomic and molecular physics, chemical physics, or chemistry. Experience in synchrotron based spectroscopy and multiparticle imaging techniques is an advantage. She/he must be capable of working within a broader research team and demonstrate good written and verbal communication skills.

**References to previous work:** R. Guillemin, et al., Phys. Rev. Lett. 109, 013001 (2012). F. Trinter et al., Nature 505, 664 (2014).