LABORATOIRE INTERACTIONS, DYNAMIQUES ET LASERS

LIDYL-UMR 9222
CEA, CNRS, Université Paris-Saclay

SEMINAIRE LIDYL

Saikat Nandi

Atomic Physics Division, Lund University, Sweden

ATTENTION JOUR INHABITUEL
Le Jeudi 25 Janvier 2018 à 11h00
- Bâtiment 522 - Salle 138

"Dynamical processes in photoionization of atoms and molecules"

The interaction between photons and isolated atoms and molecules acts as a direct probe for the structure of matter at a fundamental level. With the advent of third-generation synchrotron radiation sources, intense free electron lasers and table-top high-order harmonic generation based sources, photoionization and relevant spectroscopic techniques are becoming ever-more powerful methodology in this regard.
One of the most intriguing phenomena that occurs during electron emission from atoms and molecules following photoionization is the quantum interference effect. When studied in frequency domain, the effect which stems from the interference between two different quantum paths reaching the same final destination, can be observed in a variety of photoemission processes. A few examples include coherent emission of electrons following photoionization of a linear molecule [1-2], diffraction of an ionized electron wave in the surrounding molecular potential [3-4], resonant excitation of closely-lying electronic states with equal symmetry and their subsequent decay [5] etc. While experimental observation of the quantum interference effect is in itself fascinating, it can also be utilized as a means to study photoionization processes in time domain. Over the last decade this has evolved into an important interferometric technique [6] for studying electronic motion in atoms and molecules on their natural timescale [7]. Two-color pump-probe spectroscopy based on this technique has shed light on the dispersion dynamics of electron wave-packets scattered in the atomic potential, proving that the photoemission process is not instantaneous [8].
In this talk, we will elaborate experimental results from energy-resolved photoemission studies that showcase the interference effect. Moreover, we will discuss how the aforementioned interferometric approach can be used to study fundamental properties of atoms and molecules in the time-domain

References

1. D. Akoury *et al.*, Science **318**, 949 (2007)
2. X.-J. Liu *et al.*, Nature Photonics **9**, 120 (2015)
3. E. Plésiat *et al.*, Physical Review A **85**, 023409 (2012)
4. S. Nandi *et al.*, Physical Chemistry Chemical Physics **18**, 3214 (2016)
5. S. Nandi *et al.*, Physical Review A **96**, 052501 (2017)
6. P. M. Paul *et al.*, Science **192**, 1689 (2001)
7. V. Gruson *et al.*, Science **354**, 734 (2016)
8. M. Isinger *et al.*, Science **358**, 893 (2017)

Formalités d'entrée :

Visiteur U.E. *: Se faire connaître au moins 48 heures à l'avance pour l'établissement de votre autorisation d'entrée sur le Centre de Saclay.*
Visiteur hors U.E. *: Se faire connaître au moins 4 jours à l'avance pour les formalités d'entrée et se faire accompagner par un agent CEA.*
Sans autorisation, vous ne pourrez entrer sur le Centre de Saclay. Tél. : 33.1.69.08.74 09- Fax : 33. 1.69.08.76.39 - email : caroline.lebe@cea.fr ou veronique.gereczy@cea.fr
Dans TOUS LES CAS, se munir d'une pièce d'identité (passeport et carte d'identité - pas de permis de conduire)