

12th February 2014 - 2:00 p.m.
 CFEL-bldg. 99, seminar room IV

Vitali Averbukh

Quantum Optics and Laser Science, Department of Physics, Imperial College London

New attosecond spectroscopies for correlation-induced electron hole dynamics

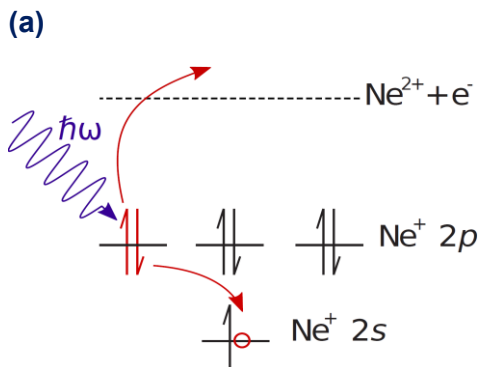
In this talk I will present two of our recent ideas for new attosecond time-resolved measurements of electron hole dynamics [1,2]:

- *Single-photon* laser enabled Auger decay (*spLEAD*) spectroscopy
- High-harmonic generation (HHG) spectroscopy of Auger-type transitions.

Unlike the well-known attosecond streaking, the proposed spectroscopies do not rely on photo- or secondary electron emission and are applicable to ultrafast electronic processes involving bound-bound transitions, such as electron correlation-driven charge migration. We simulate the new attosecond spectroscopies using both model and *ab initio* methods. Specific applications include hole migration in glycine, atomic Auger and Coster-Kronig decays as well as quasi-exponential dynamics of molecular orbital breakdown in *trans*butadiene and propanal.

[1] B. Cooper and V. Averbukh, *Phys. Rev. Lett.* **111**, 083004 (2013).

[2] J. Leeuwenburgh, B. Cooper, V. Averbukh, J. P. Marangos and M. Ivanov, *Phys. Rev. Lett.* **111**, 123002 (2013).



Schematic representation of the *single-photon* laser-enabled Auger transition in (2s⁻¹) Ne⁺ (a) and of the HHG spectroscopy Auger decay (b).

