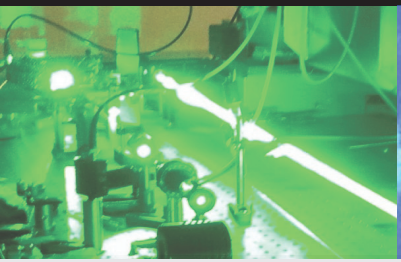
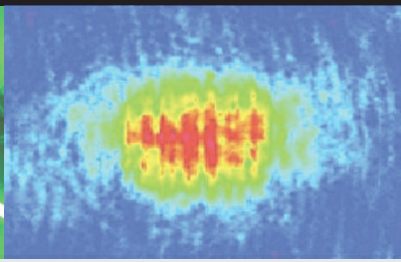
Joint UoC/FORTH AMO Seminar



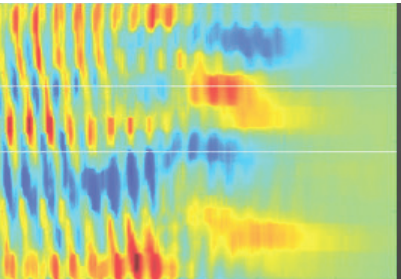


Tracking ultrafast phenomena @ home & the perspective of ELI-ALPS

Prof. Dimitris Charalambidis - UoC & FORTH-IESL

Confinement of moving charges in the dimensions of an atom/molecule compels them to ultrafast motion with characteristic times in the fs (=10^{-15} s) or even sub-fs regime. Capturing fs scale phenomena requires optical techniques utilizing ultra-short pulses of sub-fs duration. Such pulses are synthesized by the phase correlated components of broadband E/M radiation reaching in the XUV or x-ray spectral regions. The principles of diffraction tell us that such pulses may also provide high spatial resolution. The combined highest possible spatio-temporal resolution defines the long-term mission of the so called attosecond science (1as=10^{-18} s), namely the visualization of structural ultrafast dynamics. Attosecond pulses are produced with table top fs lasers through high harmonic generation (HHG). Systematic efforts in HHG pulse engineering have led to pulse energies high enough for the observation of two-XUV-photon processes. These processes are pivotal to the realization of XUV-pump-XUV-probe measurements, one of the advanced techniques used for the study of ultrafast phenomena. In this talk I will introduce the field and give examples of relevant research conducted at FORTH-IESL, while highlighting innovative science opportunities opening up at the under implementation European Research Infrastructure ELI-ALPS.

November 29 2017, 16:30, Physics Department 3rd Floor Seminar Room



$$|\Phi_1\rangle = \frac{1}{\sqrt{2}}(|1\rangle \otimes |0\rangle + \tan\theta|1\rangle \otimes |0\rangle + \sqrt{1-\tan^2\theta}|1\rangle \otimes |1\rangle)$$

$$|\Phi_2\rangle = \frac{1}{\sqrt{2}}(|1\rangle \otimes |0\rangle - \tan\theta|1\rangle \otimes |0\rangle - \sqrt{1-\tan^2\theta}|1\rangle \otimes |1\rangle)$$

$$|\Phi_3\rangle = \sqrt{1-\tan^2\theta}|1\rangle \otimes |0\rangle - \tan\theta|1\rangle \otimes |1\rangle_z$$

$$|\Phi_4\rangle = |0\rangle \otimes |1\rangle$$

$$\hat{\pi}_0 = (1-p)|0\rangle\langle 0| + p|1\rangle\langle 1|$$

$$\hat{\pi}_1 = (1-p)|1\rangle\langle 1| + p|0\rangle\langle 0|$$