ΓΕΝΙΚΟ ΣΕΜΙΝΑΡΙΟ ΤΜΗΜΑΤΟΣ ΦΥΣΙΚΗΣ

PHYSICS COLLOQUIUM

Thursday, 30 September 2010
17:00-18:00

3rd Floor Seminar Room

"*Capturing motion at the atomic unit timescale*"

D. Charalambidis

Department of Physics, Univ. of Crete, PO Box 2208, GR71003 Heraklion, Greece
and *FORTH-IESL, PO Box 1527, GR711 10 Heraklion, Greece*

Abstract

Real time studies of dynamic processes involving ultra-fast electronic motion in all states of matter require temporal precision of the order of the atomic unit of time [24.1889 *attoseconds* (*asec*), 1atto=10^{-18}]. Intensive efforts in ultra-short radiation pulse engineering led some ten years ago to the breakthrough into the *attosecond* regime. Since then, continuous progress has I) brought the pulse duration down to ~80asec, allowing the tracking of ultra-fast intra-atomic motion, or II) increased the pulse energy to few *μJ* per *asec* burst, leading to the observation and exploitation of non-linear processes in the extreme-ultra-violet (XUV) spectral regime.
In this presentation we review the field of "*attoscience*", introducing the intricacies of *asec* pulse generation, communicating the challenge of *asec* pulse metrology and highlighting benchmark applications.