



**Università
degli Studi
di Palermo**

Dipartimento di Ingegneria
Direttore: prof. Antonino Valenza



Co.R.I. PROJECT SEMINARS ANNOUNCEMENT

Prof. Dimitris Charalambidis, Emeritus at the Department of Physics, University of Crete, IESL-FORTH (<https://www.iesl.forth.gr/>), Heraklion (Crete, Greece), Chief Scientific Advisor at ELI-ALPS (Extreme Light Infrastructure Attosecond Light Pulse Source, <https://www.eli-alps.hu/>), Szeged (Ungheria), will give two lectures on "Physics and Technology of Femto and Attosecond Lasers", within the activities of a UniPa Co.R.I. Project 2018 (Azione D3).

- Wednesday April 27th, 15:00-18:00.
- Thursday April 28th, 15:00-18:00.

Venue will be Viale delle Scienze, Edificio 6 (ex D.I.N.), Second Floor, Aula Calcolatori (S06P2067). Below please find a list of subjects.

On the next morning, from 10:00 to 13:00, Prof. Charalambidis will be available for further discussions.

Students who will attend the lectures may apply for credits, according to the rules of their own study programme.

Further informations can be asked to Prof. Salvatore Basile (tel.: 09123899064, email: salvatore.basile@unipa.it).



Physics & Technology of Femto & Attoseconds Lasers
Dimitris Charalambidis
University of Crete/FO.R.T.H.-I.E.S.L.

Principles of lasers

1. Gaussian beams
2. Optical cavities
3. Laser oscillations and amplification

fs - laser pulse technology and metrology

1. Mathematical description of pulses
2. Linear propagation
3. Dispersion
4. Dispersion and dispersion control
5. Non-linear phenomena
6. Self-phase modulation (SPM); Self-focusing (SF)- B Integral/beam collapse
7. Mode-locking
8. Kerr Lens Mode-locking
9. Optical parametric oscillation/amplification
10. Chirped Pulse Amplification – Regenerative amplifier – multi-pass amplifier
11. Temporal characterization of pulses
12. FROG
13. SPIDER

Attosecond science

1. Attosecond pulses generation
2. The atomic response – the three step model (s)
3. The macroscopic response – phase matching
4. Temporal characterization of attosecond pulses
5. XUV-IR cross-correlation applications of attosecond pulses
6. Non-linear processes in the XUV spectral region
7. XUV-pump-XUV-probe applications of attosecond pulses

The Extreme Light Infrastructure (ELI) European user research facility

1. Description of the ELI Beamlines (ELI-BL) pillar
2. Description of the ELI –Attosecond Laser Pulse Source (ELI-ALPS) pillar
Description of the ELI-Nuclear Physics (ELI-NP) pillar
3. Examples of experiments conducted at ELI-BL
4. Examples of experiments conducted at ELI-ALPS
5. Examples of experiments conducted at ELI-NP
6. ELI-ERIC and practical information