Training Course:
DISPERSION / STRETCHER / COMPRESSOR CHARACTERISATION FOR ULTRA-INTENSE LASERS

Objectives

- Understand the dispersion laws for ultra-short pulses
- Review current dispersion techniques (especially stretching techniques)
- Visit pioneering intense-laser laboratories on the Saclay plateau
- Visit a world-famous grating company
- Interact with industrial partners and leading scientists
- Initiate collaborations

Plan

- Lectures: 2.5 days
- Hands-on training: 2.5 days (limited to 15 participants)

Prerequisite

- Degree in lasers and optics

Audience

- Users or designers of high-intensity, high-energy, or high-average-power lasers
- Technicians, Engineers, researchers
- Undergraduates and Ph.D. students

Dates and Location:

- Ecole Polytechnique - Laboratoire LULI
- 28 May to June 1 (5 days)

Teachers:

• Nicolas Bonod	Institut Fresnel, Marseille
• Eric Cormier	CELIA Bordeaux
• Arnaud Cotel	Horiba Jobin-Yvon, Palaiseau
• Frederic Druon	Institut d'Optique, Palaiseau
• Nicolas Forget	Fastlite, Sophia-Antipolis
• Catherine Le Blanc	LULI, Ecole Polytechnique, Palaiseau
• Bruno Le Garrec	LULI, Ecole Polytechnique, Palaiseau
• Luc Martin	LULI, Ecole Polytechnique, Palaiseau
• Gerard Mourou	IZEST, Ecole Polytechnique, Palaiseau
• Dimitrios Papadopoulos	LULI, Ecole Polytechnique, Palaiseau
• Fabien Quere	CEA, Saclay
• Aline Vernier	LOA, ENSTA Paris-Tech, Palaiseau
• Ji-Ping Zou	LULI, Ecole Polytechnique, Palaiseau

Program :

Opening

- CPA the origins. Gerard Mourou

Basic Concepts : Stretching/compression principle

- Dispersion generality (Theory) : Eric Cormier
- CPA basics: Catherine Le Blanc
- CPA at the extreme (UHE, UHI, UHRR, UShort (Attosecond regime): Frederic Druon

Grating Technology

- Methods to manufacture a grating: Arnaud Cotel
- Dimensioning and characterization of high damage threshold grating: Nicolas Bonod
- Methods to clean a grating: Aline Vernier

Optimization and Characterization

- Grating and Optic metrology: Bruno Le Garrec
- Different temporal methods to characterize and optimize a pulse (classic method and active): Nicolas Forget
- New method to characterize a pulse. Taking in consideration the spatio temporal effect especially in stretcher and compressor: Fabien Quere

Simulations/ Practical work:

- Laser safety training: Luc Martin
- Grating principle. Alignment: Dimitris Papadopoulos
- Compressor simulation with Zemax: Ji-Ping Zou
- Optimizing a laser chain: stretcher/Amplifiers/compressor: Lucas Ranc
- Aligning a compressor in virtual 3D. Dimitris Papadopoulos and Catherine Le Blanc

Lab Work:

- Grating and dispersive mirrors Characterization: efficiency, flatness and dispersion. ½ Day.
- Alignment, optimization and temporal characterization. One Full Day
- Lab Visit: LOA, LULI-Elfie, LULI-2000, APOLLON
- Horiba Jobin-Yvon Visit.