SC3 | Understand laser sources

Nouveau Programme

NIVEAU : BASIC

Publics : Senior technicians and engineers (design office, R&D, fabrication / production, fabrication support, industrialization, ...) needing a first approach to work with lasers

Prérequis : Basic knowledge in physics and optics

Responsable(s) pédagogique(s) : François Balembois - Enseignant-chercheur à l'Institut d'Optique

Langue de la formation : French

Capacité maximum : 12

Prix : 2150€ HT - **Durée :** 5 days - 35 h

Objectifs

Understand basic properties ans associated technologies

Acquire a basic experimental know-how on laser sources

Operate a laser under good conditions for various applications

Interact with laser specialists or laser salers

Understand a laser data sheet

Thèmes abordés

- Laser physics and non linear optics
- Properties, technologies and applications
- Pulsed lasers
- Laser safety
- Laser alignment (labworks)
- Laser characterization (labworks)
- Laser propagation through optical systems (labworks)

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Le programme

Basic principles
- Light-matter interaction, spontaneous emission, stimulated emission, absorption, cross section, amplification, gain, oscillation threshold, output power

Non linear optic
- Principles and application to frequency doubling and sum frequency generation

Laser properties, gaussian beams

Laser technology
- Gas lasers, solid state lasers, laser diodes, fiber lasers

The laser market worldwide

Laser applications
- Material processing, optical telecommunications, sensing, measurements, biomedical...

Pulsed lasers
- Q:switched and mode-locked lasers and related technologies

Laser safety
- Effets on tissues, standards, caution of use

Labworks and experimental demos
- He Ne laser: cavity alignement, observation and characterization of transverse and longitudinal modes
- Laser diode: angular and spectral characterisation, effect of the temperature and of the driving current on the output characteristics
- Second harmonic generation in a KDP crystal
- Flashpumped Nd:YAG laser: energetic and temporal characterization, alignement and observation of differents pulsed regims: free running and passive Q-qwitching
- Diode pumped Nd:YVO4 in passive mode-lock operation: alignment and pulse measurement by autocorrelation
- Laser beam propagation through an optical system

Méthodologie et évaluation

This training is based on three mains axis:
- basics principles
- overview of technologies
- a solid experimental training on lasers