UE Optics

Niveau d'étude
Bac +4

ECTS
6 crédits

Composante
UFR Physique, Ingénierie, Terre, Environnement, Mécanique (PhITEM)

Période de l'année
Automne (sept. à dec./janv.)

Diplômes intégrant cet élément

- Master Nanosciences et nanotechnologies

Langue(s) d'enseignement: Anglais

Ouvert aux étudiants en échange: Oui

Code d'export Apogée: PAX7NQAD

Présentation

Description

Laser and nonlinear optics - 20h
The laser aspects will focus on the study of the gain medium and the resonator including the notions of oscillation threshold, Gaussian optics, stability, cavity modes and the different temporal regimes. Concerning nonlinear optics, it will deal with laser frequency synthesis and mixing like second harmonic generation, optical parametric amplification and optical parametric oscillation. Notions of crystal optics will be given in this framework.

Optical spectroscopy – 20h
This lecture concerns itself with the interaction between light and matter. In this part, we present a theoretical framework to discuss the absorption, emission, and luminescence properties of, principally, gas phase molecular systems. Experimental techniques will be discussed, including modern and state-of-the-art techniques used in the environmental (e.g., infrared trace gas detection) and life sciences (such as Raman non-linear spectroscopies).
Guided optics – 10h

Informations non contractuelles.
Dernière mise à jour le 30 juin 2026

The objective of this part of the course is to give an insight into guided wave optics. Starting from Maxwell's equations, guided waves in planar (1d) structures will be presented. The notions of effective index and modal distribution will be explained and practical tools to compute them will be given. An overview of guided modes in bidimensionnal structures will also be given. The effective index method will be used to obtain a first approximation of the modes supported by these structures.

Heures d'enseignement

CMTD	Cours magistral - Travaux dirigés	50h
TP	TP	8h

Période : Semestre 7

Infos pratiques

Campus

Grenoble - Domaine universitaire

Informations non contractuelles.
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