UE Nanophotonics & plasmonics

ECTS
3 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: PAX9NPAE

Présentation

Description

This lecture aims at introducing the light-matter interaction in semiconductor microstructures and metallic nanostructures. These objects allow tailoring and localizing the field distribution and polarization even at a subwavelength scale and can be used to boost the light-matter interaction with quantum emitters (including absorption, spontaneous and stimulated emission). Amazing effects such as enhancement or inhibition of spontaneous emission, nonlinear effects down to the single photon level have been demonstrated. This paves the way to new generation of optoelectronic devices like single photon sources, quantum optical gates, nanoscale optical modulators, ultrasensitive sensors, etc.

The lecture is divided into two main parts:

- **Nanophotonics** : Basics of quantum light-matter interaction, Dielectric optical microcavities, CQED with artificial atoms, CQED-based optoelectronic devices, Micro-cavity polaritons

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

- **Plasmonics** : Electrodynamics of metals, Surface plasmon polaritons, Nanostructure for coupling and guiding SPPs, Localized surface plasmons, Optical process exaltation by plasmons

Heures d'enseignement

CMTD	Cours magistral - Travaux dirigés	24h

Pré-requis recommandés

Basic courses of quantum mechanics (up to time-dependent perturbation theory and Fermi’s golden rule), Maxwell’s equations, dielectric materials, wave optics

Période : Semestre 9

Infos pratiques

Lieu(x) ville

Grenoble

Campus

Grenoble - Domaine universitaire

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