



UE Nanophotonics & plasmonics

 ECTS
3 crédits

 Composante
UFR PhITEM
(physique,
ingénierie, terre,
environnement,
mécanique)

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

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

Heures d'enseignement

UE Nanophotonics & plasmonics - 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