

UE Nanophotonics & plasmonics



Level
Baccalaureate
+5



ECTS
3 credits



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



Semester
Automne

- > **Teaching language(s):** English
- > **Open to exchange students:** Yes
- > **Code d'export Apogée:** PAX9NPAE

Presentation

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

Course parts

UE Nanophotonics & plasmonics - CMTD

Lectures (CM) & Teaching Unit (UE)

24h

Recommended prerequisites

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

Period : Semester 9

Useful info

Place

> Grenoble

Campus

> Grenoble - University campus