

Master Nanosciences et nanotechnologies

High resolution imaging

Responsable	Descriptions	Informations
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	Nature :	Nombre de crédits :
	Domaines : Sciences et Technologies	

LANGUE(S) D'ENSEIGNEMENT

Anglais

CONTENU

This course concerns the characterization of nanostructures by:

1) near-field microscopy: scanning tunneling microscopy (STM) and atomic force microscopy (AFM)

2) electron microscopy: high resolution transmission electron microscopy (HRTEM) and low energy electron microscopy

The training is focused on the practical implementation of these techniques via lab tests on lab instruments in small groups of students. The aim of this course is to give basic practical and theoretical skills to understand and implement the operating modes of these microscopes. Students will also have to master the characterizations to which these types of microscopies give access (resolution, origin of the contrast ...).

Topics :

- Introduction to near field microscopy (STM & AFM) : Concepts; key elements; STM (tunnel current, resolution, spectroscopy); AFM (tip-surface forces, dynamic modes, resolution, specificities related to the environment)
- Introduction to electronic microscopies (LEEM & HRTEM) : Optics for electrons, Fourier optics; Theory for the formation of images, methods for image simulation, Analysis technics
- Practical work: STM and tunnel spectroscopy in UHV environment
- Practical work : AFM in liquid cell: characterization of biological nanostructures
- Practical work : Non-contact AFM in UHV environment: characterization of inorganic nanostructures and thin films. Advanced methods (Kelvin probe).
- Practical work : LEEM: in-situ characterization of a phase transition (dark and bright fields)
- Practical work : HRTEM: Quantitative analysis of the contrast (structure and deformations)

PRÉ-REQUIS OBLIGATOIRES

Basics of electronic microscopy (SEM), scanning probe microscopy (AFM, STM)

Signal processing and sensors

VOLUME HORAIRE

- Volume total: 28 heures
- Cours magistraux: 8 heures
- Travaux pratiques: 20 heures

CODES APOGÉE

- SNNC25BJ [ELP]

M3C

Aucune donnée M3C trouvée

POUR PLUS D'INFORMATIONS

[Aller sur le site de l'offre de formation...](#)



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