



FORMULAIRE D'INSCRIPTION AUX FORMATIONS SPÉCIFIQUES ED PSIME

Document à retourner à marie.legay@unicaen.fr **avant le 23 mars 2022**

NOM / Prénom du doctorant :

Inscription en : 1^{ère} année 2^{ème} année 3^{ème} année année dérogatoire

E-mail :

Établissement :

École doctorale :

Inscription aux formations spécifiques de l'École Doctorale :

Materials and optical characterization * (à Caen)

Characterization of the surface of functional crystalline materials : from fundamental to application* (à Caen)

** cf descriptif, date et volume horaire page suivante*

★ **Materials and optical characterization – 4h lecture, 20h Pratical Work – Alain BRAUD, Christophe LABBE, Julien CARDIN et Philippe MARIE**

Course Location : Caen, campus 2, bâtiment F

This course focuses on the optical characterization of materials. The practical part of this course will aim at the implementation by the PhD students of various characterization techniques (FTIR, Ellipsometry, Absorption, Emission and time-resolved spectroscopy...). It is intended for PhD students of the ED PSIME wishing to develop their knowledge in this field.

Course (4 hours)

- Spectroscopic properties of luminescent and non-luminescent materials
- Spectroscopic measurement techniques

Small group practical work (20 hours)

- FTIR spectroscopy
- Ellipsometry
- Absorption and transmission spectroscopy
- Emission and excitation spectroscopy
- Time-resolved emission spectroscopy (spectra and fluorescence dynamics)

Merci d'indiquer vos disponibilités (cochez la case correspondante si une des semaines ne vous convient pas) :

du 13 au 17 juin 2022

★ **Characterization of the surface of functional crystalline materials : from fundamental to application – 24h – Adrian DAVID, Yohann BREARD, Isabelle MONNET, Philippe BODUCH**

In this course we will take the example of materials based on oxides know mainly for their electronic properties. We will present some modern surface characterization techniques (structure, morphology, controlled environment, etc.) used in fundamental research as well as in research and development on an industrial scale.

- **Scanning Electronic Microscopy:**Characterization at the micrometric and nanometric scale of grains and grain boundaries. Elemental chemical analyzes by EDS (Energy Dispersive Spectroscopy). Crystallographic structure of the compound surface by EBSD (Electron BackScattered Diffraction).
- **Transmission electronic microscopy:**Study of stress regimes of low dimensional heterostructures. High resolution imaging, electronic diffraction, GPA (Geometrical Phase Analysis) technique.
- **Atomic Force Microscopy:**Roughness state of the surface of a sample. Analysis of a magnetic behavior (MFM) or piezoelectric (PFM), approach relation structure / properties
- **X-ray diffraction:** Reflectivity and grazing incidence measurements
- **Wettability:**Behavior of the surface of the material by relating the synthesis conditions and the interaction with a solvent deposited on the surface (biocompatible materials ..)
- **Introduction to the ion matter interaction**
- **Ion beam analysis:**principles, use, advantages of techniques: PIXE / PIGE, RBS, NRA, ERDA
- **SIMS (secondary ionization mass spectrometry) – TOF (time-of-flight) analysis**
- **Ion beam spectrometry:**LEIS MEIS

Dates proposées :

les 17 et 18 mai 2022

les 24 et 25 mai 2022