Master in Photonics – "PHOTONICS BCN"
ERASMUS+ "EUROPHOTONICS"

MASTER THESIS PROPOSAL

Dates: April - September 2020

Laboratory : Attoscience and Ultrafast Optics
Institution: ICFO
City, Country : Castelldefels, Spain

Title of the master thesis: Optical characterisation of thin films for studying ultrafast light-matter interactions.

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Keywords : attosecond science, condensed phase physics, spectroscopy

Summary of the subject (maximum 1 page) :

In the Attoscience and Ultrafast Optics group at ICFO we study light-matter interactions in condensed matter systems on ultrafast attosecond time-scales. Our table-top beamline is capable of generating isolated soft x-ray attosecond pulses via high-harmonic generation. Such ultrashort soft x-ray pulses give access to study electronic and lattice dynamics in solids after the excitation with a strong optical field. The element specific absorption of x-rays and their short wavelength require samples of high structural quality.
This project focusses on the fabrication of thin film solid samples and their optical and structural characterisation. Typically, bulk crystals are first cut into few tens of nanometre thick films with an ultramicrotome and their structural properties such as thickness, surface quality, and homogeneity are characterised with an AFM, SEM, EELS, and optical microscope. The optical response to an ultrashort, high-intensity laser, such as absorption and damage threshold is then studied with an optical setup which will be designed and build during this project.

Additional information :
* Required skills :
* Miscellaneous :