

Master 2: *International Centre for Fundamental Physics*

INTERNSHIP PROPOSAL

(One page maximum)

Laboratory name: Institut des Sciences Moléculaires d'Orsay (ISMO)
CNRS identification code: UMR 8214
Internship director's surname: Pierre Çarçabal
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Web page: <http://www.ismo.universite-paris-saclay.fr/spip.php?article2364>
Internship location: ISMO

Thesis possibility after internship: YES/NO
Funding already obtained for a PhD: YES/NO If YES, which type of funding:

Title: Laser spectroscopy of biomolecular systems : structure, interactions and selectivity

Biological systems are governed by molecular interactions of physical nature (electrostatics, dispersion, polarization, repulsion) that can be probed by gas phase laser spectroscopy techniques experiments, in combination of theoretical molecular modeling methods based on either classical or quantum physics.

Characterizing the interactions between peptides and carbohydrates is of prime importance in biology, as sugars play a major role in molecular recognition processes and peptides are models for sugar receptor proteins (lectins).

The goal of the internship will be to combine experiments and theory to evidence the structures of simple molecular systems forming a sugar-peptide complex.

The intern will be introduced to several experimental techniques used in many fields of experimental physics : lasers and optics, IR and UV spectroscopy, laser desorption of biomolecules, supersonic expansions to cool down the molecules and stabilize the complexes, mass spectrometry detection, vacuum techniques. In parallel, the simulation of the spectra to interpret the data and their physical interpretation will also be part of the project.

This project may continue by a PhD work where systems of increasing complexity will be studied in an interdisciplinary approach in close collaboration with researchers from the biochemical and biomedical communities.

Please, indicate which speciality(ies) seem(s) to be more adapted to the subject:

Condensed Matter Physics: ~~YES~~/NO Soft Matter and Biological Physics: YES/~~NO~~
Quantum Physics: YES/~~NO~~ Theoretical Physics: ~~YES~~/NO