

Spécialité de Master « Optique, Matière, Paris »

Stage de recherche (4 mois minimum, à partir de début mars)

Proposition de stage (ne pas dépasser 1 page)

Date de la proposition : 14/10/2020

Responsable du stage / internship supervisor:

Nom / name: JOFFRE Prénom/ first name : MANUEL
Tél : 0674647026 Fax :
Courriel / mail: manuel.joffre@polytechnique.edu

Nom du Laboratoire / laboratory name:

Code d'identification : UMR 7645 Organisme : Ecole polytechnique – CNRS –INSERM

Site Internet / web site: <https://portail.polytechnique.edu/lob/fr>

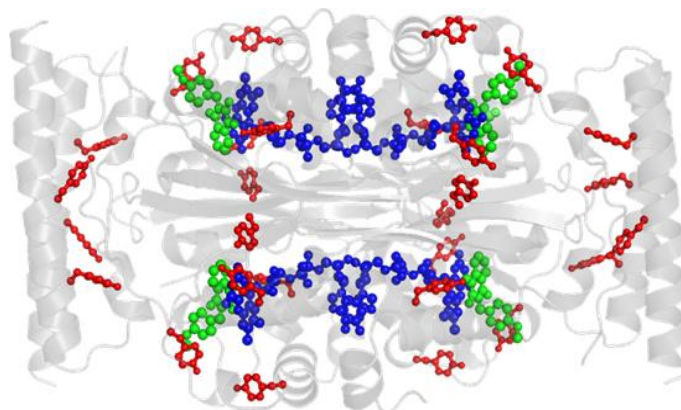
Adresse / address: Ecole polytechnique, 91128 Palaiseau

Lieu du stage / internship place: Palaiseau

Titre du stage / internship title: Mid-infrared femtosecond spectroscopy in flavoenzymes

Résumé / summary

Laboratoire d'Optique et Biosciences benefits from a cross-disciplinary environment where physicists and biologists work together in order to address relevant issues in biology through the development of new optical methods, based for example on femtosecond lasers and nonlinear optics. In this context, the host team is more particularly developing femtosecond spectroscopy in the mid-infrared (mid-IR) and visible spectral domains in order to control and probe biomolecules such as hemoproteins [1-3]. The available experimental setup consists of a 1-kHz femtosecond mid-IR pulses source, relying on an amplified Titanium:Sapphire laser system pumping two nonlinear stages.



The internship project will deal with mid-infrared femtosecond pump-probe spectroscopy in thymidylate synthase ThyX. This essential flavoenzyme, whose 3D structure is shown above, is present only in bacteria and thus constitutes a promising antimicrobial target [4]. In collaboration with LOB biologists, unnatural amino acids will be incorporated at specific sites of the protein so that relevant local information on structure fluctuation can be extracted from the experimental data. Continuation towards a PhD will take place in the framework of the MIRTHYX project (ANR-19-CE30-0001), in collaboration with Institut d'Optique Graduate School and Amplitude Lasers.

[1] C. Falvo, L. Daniault, T. Vieille, V. Kemlin, J.-C. Lambry, C. Meier, M.H. Vos, A. Bonvalet, M. Joffre, J. Phys. Chem. Lett. 6, 2216-2222 (2015).

[2] V. Kemlin, A. Bonvalet, L. Daniault, M. Joffre, J. Phys. Chem. Lett. 7, 3377-3382 (2016).

[3] J.A. De La Paz, A. Bonvalet, M. Joffre, Opt. Express 27, 4140 (2019)

[4] H. Myllykallio, G. Lipowski, D. Leduc, J. Filee, P. Forterre, U. Liebl, Science 297, 105 (2002).

Ce stage pourra-t-il se prolonger en thèse ? Possibility of a PhD ? : Yes

Si oui, financement de thèse envisagé/ financial support for the PhD: application to PhD grant from graduate school of Institut Polytechnique de Paris

Lumière, Matière, Interactions

x

Lasers, Optique, Matière

x

Fiche à transmettre (fichier pdf **obligatoirement**) sur le site <http://stages.master-omp.fr>