

# Spécialité de Master « Optique, Matière, Plasmas »

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

## Proposition de stage (ne pas dépasser 1 page)

Date de la proposition : 8 novembre 2013

|  |                                       |                                      |          |
|--|---------------------------------------|--------------------------------------|----------|
| <b>Responsable du stage / internship supervisor:</b>                   |                                       |                                      |          |
| Nom / name:  | WESTBROOK                             | Prénom/ first name :                 | Nathalie |
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| <b>Nom du Laboratoire / laboratory name:</b> LABORATOIRE CHARLES FABRY |                                       |                                      |          |
| Code d'identification : UMR 8501                                       |                                       | Organisme : Institut d'Optique/ CNRS |          |
| Site Internet / web site: www.lcf.institutoptique.fr                   |                                       |                                      |          |
| Adresse / address: 2 avenue Fresnel 91127 Palaiseau Cedex              |                                       |                                      |          |
| Lieu du stage / internship place: Institut d'Optique, Palaiseau        |                                       |                                      |          |

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|---|
| <b>Titre du stage / internship title:</b> Etude des erreurs programmées du ribosome par microscopie de fluorescence en molécule unique / <i>Study of programmed errors in eukaryotic translation using single molecule fluorescence microscopy</i>  |
| <b>Résumé / summary</b><br>Protein synthesis is a fundamental cellular process. This function is performed by a molecular motor, the ribosome, which structure has been elucidated in the early 2000s (see 2009 Nobel prize in Chemistry). However the dynamics of this motor still remains a mystery in many respects, involved in processes as diverse as antibiotics efficiency, virus replication or genetic diseases associated with the defective synthesis of certain proteins. Single molecule studies using fluorescence microscopy have already brought new insight on the dynamics of prokaryotic ribosomes, but to this day very few results have been published on eukaryotic ribosomes, which are more complex.<br>During Nicolas Fiszman's thesis, we have observed for the first time the translation by a single mammalian ribosome, using fluorophores annealed along the translated RNA, that disappear in the course of translation. We have also revealed a delay in the first incorporation of an amino acid due to a non canonical initiation of the ribosome on an IRES structure of the RNA. Such structures are involved in the replication of certain viruses. Following on those results, we want to study the modification in the kinetics of the ribosome translation due to programmed errors such as reading through stop codons or frameshifting.<br><br>In the PhD project starting in oct 2014, the student will work jointly with a PhD student in biology who started his PhD with the IGM team in october 2012. He/she will also take part in the experiments on prokaryotic ribosomes with the CGM and ISV teams in Gif/Yvette. Understanding the biological objectives will be necessary to contribute efficiently to this type of interdisciplinary project, and this will be facilitated by a shared direction of the thesis with the IGM team. Funding for the PhD will be searched from interdisciplinary programmes, but it will still be a PhD in physics, within the Ecole Doctorale Ondes et Matière (EDOM, n°288). |
| <b>Toutes les rubriques ci-dessous doivent obligatoirement être remplies</b>  |

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| <b>Ce stage pourra-t-il se prolonger en thèse ? Possibility of a PhD ? : OUI/YES</b>  |          |                                     |          |
| <b>Si oui, financement de thèse envisagé/ financial support for the PhD: Bourse Ecole Doctorale EDOM/ grant from the doctoral school EDOM</b> |          |                                     |          |
| Lasers, Optique, Matière  | <b>x</b> | Lumière, Matière : Mesures Extrêmes | <b>x</b> |
| Plasmas : de l'espace au laboratoire  |          |                                     |          |

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