

# 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 : 24 octobre 2018

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|--|---|----------------------|------------|
| <b>Responsable du stage / internship supervisor:</b> |   |                      |            |
| Nom / name:  | GLOAGUEN  | Prénom/ first name : | ERIC       |
| Tél :  | 0169083582  | Fax :                | 0169081213 |
| Courriel / mail:                                     | eric.gloaguen@cea.fr  |                      |            |
| <b>Nom du Laboratoire / laboratory name:</b>         |   |                      |            |
| Code d'identification :                              | UMR9222   | Organisme :          | CEA-CNRS   |
| Site Internet / web site:                            | <a href="http://iramis.cea.fr/LIDYL/Phocea/Vie_des_labos/Ast/ast_groupe.php?id_groupe=601">http://iramis.cea.fr/LIDYL/Phocea/Vie_des_labos/Ast/ast_groupe.php?id_groupe=601</a> |                      |            |
| Adresse / address:                                   | CEA/Paris-Saclay DRF/IRAMIS/LIDYL   |                      |            |
| Lieu du stage / internship place:                    | CEA/Paris-Saclay DRF/IRAMIS/LIDYL Bât. 522  |                      |            |

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| <b>Titre du stage / internship title:</b> Laser spectroscopy of isolated and microsolvated ion pairs  |
| <b>Résumé / summary</b><br>Ion pairs are ubiquitous supramolecular objects in Nature, from sea water and aerosols, to living organisms. These paired ions are the very first step of crystallisation of ionic species, they influence the properties of ion-concentrated solutions or ionic liquids, and play a key role in countless applications. Although they are met in many areas of Physics, Chemistry and Biology, their characterisation is complicated by the co-existence of several types of pairs and their elusive nature in solution. Gas phase studies, however, can investigate neutral ion pairs at the atomic scale by IR and UV laser spectroscopy. Combined to quantum chemistry calculations, this approach can characterise the structure of flexible molecular ion pairs, and analyse the main non-covalent interactions that control their shape [1].<br><br>This project aims at studying the effect of a counter-ion on the folding of a molecular ion, and at describing the local organisation of the solvent molecules around the paired ions for a few model systems. The main work will be experimental, and will enable the master student to gain experience on a set of various instruments (OPO lasers, dye lasers, mass spectrometer, molecular beam) and techniques (laser desorption, IR/UV double resonance spectroscopy, formation of complex systems in the gas phase). This project will also address theoretical aspects, giving to the student an overview of a scientific project where quantum chemistry calculations and laser spectroscopy complement each.<br><br><a href="http://iramis.cea.fr/LIDyL/">http://iramis.cea.fr/LIDyL/</a><br><a href="http://iramis.cea.fr/Pisp/70/eric.gloaguen.html">http://iramis.cea.fr/Pisp/70/eric.gloaguen.html</a><br>[1] Habka, S.; Brenner, V.; Mons, M.; Gloaguen, E. Journal of Physical Chemistry Letters 2016, 7, 1192. |
| <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</b>                               |  |                          |  |
| <b>Si oui, financement de thèse envisagé/ financial support for the PhD: Bourse de l'Ecole Doctorale ED571</b> |  |                          |  |
| Lumière, Matière, Interactions   |  | Lasers, Optique, Matière |  |

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