Spécialité de Master « Optique, Matière, Paris »

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

Proposition de stage

Date de la proposition : 5/10/2016

Responsable du stage / *internship supervisor*:

Nom / *name*: **MANIL** Prénom/ *first name* : **Bruno**

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Nom du Laboratoire / *laboratory name*: **Laboratoire de Physique des Lasers (LPL)**

Code d'identification : UMR7538 Organisme : CNRS/Université Paris 13

Site Internet / *web site*: http://www-lpl.univ-paris13.fr/bms/

Adresse / *address:* 99, av. J.B. Clément F-93430 Villetaneuse

Lieu du stage / *internship place*: Institut Galilée, Campus de Villetaneuse, Université Paris 13

Titre du stage / *internship title*:

Effect of a complex environment on radiation damage: DNA sequences into liquid microdroplets containing radiosensitizers and polypeptides

Résumé / *summary*

Nowadays, hadrontherapy is a powerful emergent technique used in cancer therapy, especially for deep-seated tumors. The advantages of ion beams in cancer treatment with respect to conventional radiotherapy with photons and electrons are well known, due to their characteristic Bragg peak, small lateral spreading and increased relative radiobiological effectiveness. However, a number of important scientific issues have not been resolved, especially those related to DNA damage assessment at the molecular level.

During this PhD, the main objective is to develop an original method to study indirect effects of irradiation, combining the advantages of the *in vivo* and of the *in vaccuo* approaches currently used. This experimental project is based on the development of a new technique to put biomolecules in the gas phase, using a home-made soft laser desorption from liquid microdroplets directly into vacuum, and on the coupling of this new source with an irradiation platform and a mass spectrometry analysis. This provides a unique opportunity to study the action of radical species on pertinent biomolecular systems in the liquid phase and to apprehend the understanding of processes at the molecular level by the use of gas phase analysis techniques. In parallel, metal nanoparticles will be also included in the target in order to elucidate their enhancing effect on the radiobiological efficiency of ion irradiation, with the aim to determine the role of radiosensitizers in radical production qualitatively and quantitatively. This knowledge is essential for optimizing methods for cancer treatment based on nanoparticle enhanced hadrontherapy.

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

Si oui, financement de thèse envisagé/ *financial support for the PhD***:**

FINANCEMENT AQUIS – BOURSE MINISTERE FLECHEE SUR LE SUJET

Lumière, Matière, Interactions	**X**	Lasers, Optique, Matière	**X**