Spécialité de Master « Optique, Matière, Plasmas »

Stage de recherche (4 mois minimum, à partir de début mars 2011)

Proposition de stage pour l'année 2010-2011 (ne pas dépasser 1 page)

Date de la proposition :

Responsable du stage */ internship supervisor*: Julien Fuchs

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Nom du Laboratoire / *laboratory name*: **Laboratoire pour l'Utilisation des Lasers Intenses**

Code d'identification :UMR 7605 Organisme :CNRS/Ecole Polytechnique

Site Internet / *web site*: http://www.luli.polytechnique.fr

Adresse / *address:* Ecole Polytechnique, 91128 Palaiseau

Lieu du stage / *internship place*: Ecole Polytechnique, 91128 Palaiseau

Titre du stage / *internship title*: **Fast dynamics of ion damage track formation and ion-induced chemical reactions in solid and liquid materials**

Résumé / *summary*

The kinetics of radio-induced chemical phenomena is still poorly understood on the temporal scales that correspond to the development of the fundamental underlying mechanisms, i.e. on the sub-picosecond timescale. Their understanding represents an indispensable stage towards the control of the behavior of materials exposed to irradiation, e.g. in the nuclear industry. The proposed thesis project will focus on the experimental investigation of the fast dynamics of damage-track formation and ion-induced chemical reactions in solid and liquid samples irradiated by energetic ion beams. The investigations will exploit the exceptional properties of laser-driven ion sources, and in particular their short emission duration and the possibility to couple them with short-pulse laser probes, to characterize for the first time these phenomena on the sub-picosecond timescale. The results will be employed to benchmark Monte Carlo calculations that aim at modeling the behavior of materials subjected to ionizing irradiation and which have not been tested so far due to the lack of experimental data. The project will be realized in the frame of a collaboration between different laboratories, and namely the Laboratoire pour l'Utilisation des Lasers Intenses (LULI), the CEA-IRAMIS group in Saclay and the Laboratoire d'Optique Appliquee (LOA) and most of the experimental work will be carried out on the Saclay high-power laser.

Toutes les rubriques ci-dessous doivent obligatoirement être remplies

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*:**Ecole Polytechnique**

Lasers et matière	**x**	Lumière, Matière : Mesures Extrêmes	**x**
Optique de la science à la technologie		Physique des plasmas	**x**

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