

Spécialité de Master « Optique, Matière, Plasmas »

Stage de recherche (4 mois minimum, à partir de début mars 2012)

Proposition de stage pour l'année 2011-2012 (ne pas dépasser 1 page)

Date de la proposition 28-10-2011:

Responsable du stage / internship supervisor:	
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Code d'identification : UMR 8112	Organisme : Observatoire de Paris / Ecole Normale Supérieure / UPMC
Site Internet / web site: www.lerma.obspm.fr	
Adresse / address: Paris	
Lieu du stage / internship place: École Normale Supérieure (ENS - PARIS)	

Titre du stage / internship title: Modelling and design of shock experiments for astrophysics
Résumé / summary <p>Star formation takes place in dense molecular clouds, in the presence of magnetic fields and supersonic flows. In such environment shocks play a fundamental role in the energy balance, and are responsible for example in the dissociation of molecules and the ionization of atoms. A particularly interesting and common regime for astrophysics is that of magnetized shocks influenced by the relative diffusion of neutrals and ions (ambipolar diffusion). Under certain conditions these effects can lead to a new type of shocks, so-called continuous shocks (C-shocks), where molecules and atoms can survive relatively high shock velocities. Understanding the structure and dynamics of these shocks is essential to interpret astrophysical observations, however C-shocks have never been reproduced in the laboratory.</p> <p>The project will be part of a collaboration between French and UK institutes, where we aim at developing the first experimental study of C-shocks. The work is interdisciplinary and the student will use a number of highly-sophisticated multi-dimensional numerical tools, to probe different experimental ideas and suggest possible improvements. The physics covered will include laser-matter interaction, shocks in high-density plasmas, photoionised plasmas, multi-fluid magneto-hydrodynamics.</p> <p>Good programming skills will be necessary, as well as knowledge of LINUX, and languages such as FORTRAN and PYTHON.</p> <p>The project will be carried out in collaboration with Pierre Lesaffre (ENS) and the experimental plasma physics group at Imperial College (UK).</p>

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 Doctorale			
Lasers et matière		Lumière, Matière : Mesures Extrêmes	
Optique de la science à la technologie		Plasmas : de l'espace au laboratoire	OUI

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