

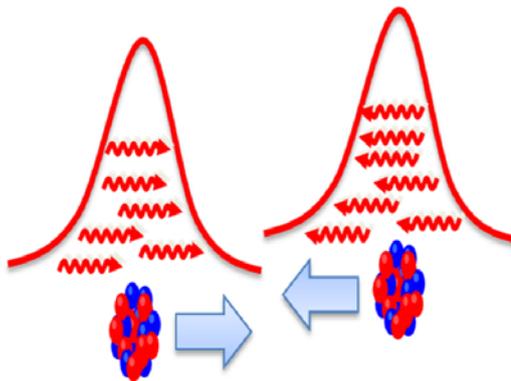
Spécialité de Master « Optique, Matière, Plasmas »

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

Proposition de stage (ne pas dépasser 1 page)

Date de la proposition : 10/10/2013

Responsable du stage / internship supervisor:	
Nom / name: TRASSINELLI	Prénom/ first name : Martino
Tél : +33 1 44 27 62 30	Fax : + 33 1 44 27 39 82
Courriel / mail: martino.trassinelli@insp.jussieu.fr	
Nom du Laboratoire / laboratory name: INSP/GSI dans le cadre du labex Plas@par	
Code d'identification : UMR75 88	Organisme : UPMC - CNRS
Site Internet / web site: http://www.insp.jussieu.fr/-Agregats-et-Surfaces-sous-.html	
Adresse / address: Tour 22-12, bureau 315, case courrier 840 ; 4, place Jussieu 75005 Paris France	
Lieu du stage / internship place: mainly at GSI- Germany (<i>supervisor: A. Gumberidze</i>)	

Titre du stage / internship title: Elementary collision processes in critical fields relevant to relativistic plasmas
Résumé / summary During the past decades, the Atomic Physics division at GSI has developed and pursued a very successful program in investigating heavy ion collisions under well-defined conditions at the Experimental Storage Ring (ESR). Both, atomic structure and reaction dynamics have been studied with an emphasis on precision experiments. So far, mainly asymmetric collisions of high energy, few-electron heavy ions, such as Pb or U, with lower Z targets such as H ₂ , He, N ₂ , and Ar have been studied. In the recent years, researchers from the Atomic Physics division at GSI started to initiate a new (complementary) experimental program at the ESR ultimately aiming at exploring physics in critical fields of (super)heavy quasimolecules under the clean experimental conditions that prevail at heavy ion storage rings. At the beginning, of specific interest are K-shell ionization and excitation in systems where the unified nuclear charge is greater than 100. Here, it is important to note that in contrast to the fast and asymmetric collisions broadly addressed up to now at the ESR, in the current endeavor, relatively slow and symmetric collisions will be in focus. This is also very interesting and challenging from theoretical point of view, as it requires non-perturbative two-center approaches.  Next year, an experiment from this program is planned at the gas jet target of the ESR aiming at observing Xe ^{54+,53+,52+} - Xe collisions. In order to obtain information concerning the impact parameter and, in particular, to pick out close collisions which are especially important for observing quasi-molecular effects, scattered ions, which had undergone close collisions with xenon atoms, will be detected by a dedicated diamond detector mounted in a specially constructed movable pocket about 3.5m downstream from the target. In addition to the detector for the scattered projectiles, the X-rays emitted from the interaction zone will be observed by an array of detectors mounted at different angles with respect to the ion beam direction. During the internship, the student will be involved in the preparation of the experiment. She/he will thus have the unique possibility to gain experience with a variety of state-of-the-art experimental techniques related to particle and photon detection as well as the corresponding electronics and data acquisition systems. A large part of the internship will be developed in Germany (GSI) while it may be continue with a PhD in our group in France. <i>This internship will be supported by the Labex PLAS@PAR with a grant up to 4500 or 6500 € for 4 or 6 months respectively.</i>

Ce stage pourra-t-il se prolonger en thèse ? Possibility of a PhD ? : YES			
Si oui, financement de thèse envisagé/ financial support for the PhD: will be submitted to PLAS@PAR			
Lasers et matière	X	Lumière, Matière : Mesures Extrêmes	X
Optique de la science à la technologie		Plasmas : de l'espace au laboratoire	X

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