

# 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 :

<b>Responsable du stage / internship supervisor:</b>			
Nom / name:	KNOOP	Prénom/ first name :	Martina
Tél :	0491288026	Fax :	
Courriel / mail:	martina.knoop@univ-amu.fr		
<b>Nom du Laboratoire / laboratory name:</b> PIIM			
Code d'identification : UMR-6633		Organisme : Université Aix-Marseille	
Site Internet / web site:			
Adresse / address: Centre St Jérôme, Case C21, 13397 Marseille cedex20			
Lieu du stage / internship place: Marseille			

<b>Titre du stage / internship title:</b> <b>Analysis and transport of an ion cloud in a double trap</b>
Résumé / summary <b>This is an offer for a PhD. Due to the funding by CNES, applications must be made before 20 march 2012</b>
<p>The best atomic clocks in the microwave domain can reach frequency fluctuations inferior to <math>3 \times 10^{-17}</math> during one day, and that for continuous operation of several months [1]. Thanks to their excellent performances and their high robustness, these devices based on the interrogation of a large ion cloud are considered for spatial applications. Ultimate performances can be reached in a two-zone trap [2], where the number of trapped ions and its stability are critical parameters.</p> <p>Our trap is inspired from the work of Jet Propulsion Laboratory (Cal Tech-NASA), consisting in a quadrupole plus multipole trap along the same axis. We trap Calcium ions, laser-cooling allows us a good control of experimental parameters; moreover it opens the way for the observation of phase transitions into an ordered state.</p> <p>The subject of the proposed thesis is to optimize the trapping device to a very sophisticated level in order to reach extremely high ion numbers, and to transport these clouds between the different zones of the trap without ion loss. Transport will make use protocols of optimal control, numerical simulations are a tool for optimization.</p> <p>[1] Atomic Clocks and Oscillators for Deep-Space Navigation and Radio Science J Prestage, G. Weaver, Proceedings of the IEEE 95, 2235 – 2247 (2007) [2] E. Burt et al. IEEE Trans. Ultrason. Ferroelectr. Freq. Control, 55 (2008) 2586</p> <p>Candidate: We are looking for a motivated student with a background in optics and interested by atomic and quantum physics topics to work on the different aspects of the experiment.</p>
<b>Toutes les rubriques ci-dessous doivent obligatoirement être remplies</b>

<b>Ce stage pourra-t-il se prolonger en thèse ? Possibility of a PhD ? : YES</b>
<b>Si oui, financement de thèse envisagé/ financial support for the PhD: CNES</b>

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

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