

Spécialité de Master « Optique, Matière, Paris »

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

Proposition de stage (**ne pas dépasser 1 page**)

Date de la proposition : 11 octobre 2015

Responsable du stage / internship supervisor: Saïda Guellati/Pierre Cladé		
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Nom du Laboratoire / laboratory name: Laboratoire Kastler Brossel		
Code d'identification : UMR8552	Organisme : UPMC-CNRS-ENS-Collège de France	
Site Internet / web site: http://www.lkb.upmc.fr/metrologysimplesystems/		
Adresse / address: LKB, T13, étage 2, 4 place Jussieu 75005 Paris		
Lieu du stage / internship place: Laboratoire Kastler Brossel, Jussieu		

Titre du stage / internship title: Atom interferometry with Bose-Einstein condensate : study of atom-atom interactions
Résumé / summary <p>Atom interferometry is now widely used to perform high precision measurements for testing fundamental physics (equivalence principle, gravity at atomic scale...). At Laboratoire Kastler Brossel, we use an atom interferometer to precisely measure the recoil velocity of an atom that absorbs a photon [1]. Such a measurement leads to a precise determination the fine structure constant α. This fundamental constant is for great interest to test quantum electrodynamics theory and to probe dark energy or internal structure of electron.</p> <p>We have recently built a new experimental setup and produced rubidium Bose Einstein condensate with more than 10^5 atoms in 2 s. The goal now is to implement an atom interferometer based on a large momentum transfer beam splitter in order to increase its sensitivity by more than one order of magnitude [2]. But using Bose-Einstein needs to control the systematic affect due to atom-atom interactions and we have developed a theoretical model to understand how internal interaction affects atomic fringes [3]. The aim of the internship is:</p> <p>1) Precise measurement of the shift induced by atom-atom interactions in an atomic interferometer based on stimulated Raman transitions. The goal is to validate the theoretical model developed in our team.</p> <p>2) Transport of the BEC using an atomic elevator based on coherent acceleration in an optical lattice.</p> <p>[1] R. Bouchendira et al. Phys. Rev. Lett. 106, 080801 (2011) [2] P. Cladé et al. Phys. Rev. Lett. 102, 240402 (2009) [3] R. Jannin et al. Phys. Rev. A 92, 013616 (2015).</p>
Toutes les rubriques ci-dessous doivent obligatoirement être remplies

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: EDPIF			
Lumière, Matière, Interactions Yes	Lasers, Optique, Matière	Yes	

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