

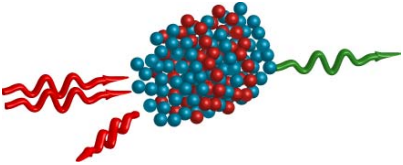
# Spécialité de Master « Optique, Matière, Plasmas »

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

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

Date de la proposition :

<b>Responsable du stage / internship supervisor:</b>			
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<b>Nom du Laboratoire / laboratory name:</b>			
Code d'identification :	USR 3573	Organisme :	CNRS, Collège de France
Site Internet / web site:	http://www.college-de-france.fr		
Adresse / address:	11 place Marcelin Berthelot, 75005 Paris		
Lieu du stage / internship place:	Collège de France, Institut de Physique (Paris 5 <sup>e</sup> )		

<b>Titre du stage / internship title:</b> Photonic interactions in spatially-structured atomic ensembles
Résumé / summary
<p>Strong coherent interactions between optical photons remain one of the main open quests in quantum optics. Besides their fundamental interest, they are required for building quantum repeaters for long-distance quantum communications, for performing complex calculations using optical qubits, for efficiently engineering strongly non-classical states of light, or for using photons to simulate more complex quantum systems.</p> <p>Our project aims at creating such interactions by using an ensemble of cold atoms to form a Bragg mirror saturated by a single photon. For this, we will transiently convert the photons into excitations of strongly interacting Rydberg atoms, which will allow us to engineer a strong non-linear coupling between modes of an optical cavity. We plan to use this device to demonstrate a quantum two-photon logic gate, to create non-classical states of light for precision measurements, and to emulate processes occurring in condensed-matter systems, with a particular focus on physics related to the quantum Hall effect.</p> <p>We look for a motivated student to join our team made of a CNRS staff scientist and of a post-doc, and to take part in the design and in the development of this project. At the timescale of the internship, the goal will be to transpose existing theoretical models to design the core of the experimental setup, and to install some of the auxiliary systems required for the experiment's operation (lasers, electronics, vacuum systems, data acquisition and control,...).</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: EDPIF Doctoral School, PSL University.</b>			
Lasers, Optique, Matière	<b>X</b>	Lumière, Matière, Interactions	<b>X</b>
Plasmas : de l'espace au laboratoire			

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