

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 :

Responsable du stage / internship supervisor:			
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Nom du Laboratoire / laboratory name: Laboratoire Pierre Aigrain			
Code d'identification : UMR 8551		Organisme : CNRS	
Site Internet / web site: http://www.lpa.ens.fr			
Adresse / address: 24, rue Lhomond Paris			
Lieu du stage / internship place: 24, rue Lhomond Paris			

Titre du stage / internship title:
Résumé / summary
<p>The team « Optique cohérente et non-linéaire » at the Laboratoire Pierre Aigrain have been studying artificial atoms isolated in a solid state system and mastering the use of their quantum properties for decades. A new activity sets-up in the group which will investigate defects in diamonds, composed of one atom coupled to a vacancy in the crystalline structure. The whole system behaves as a quasi-ideal single atom that is detectable optically via confocal microscopy.</p> <p>The project will consist in setting-up the optics around the defect in diamond to control its coupling to vacuum fluctuations.</p> <p>Quantum electrodynamical effects with a colored center in diamond will be investigated in detail. A so-called « half cavity » set-up will be built for which the local density of the vacuum fluctuations around the focal point is strongly modified even if the distance between the atom and the mirror is several centimeters. The goal is to measure with precision QED effects that have been observed with single atoms, such as the modification of the Lamb shift and the rate of spontaneous emission of a single colored center.</p> <p>It has been predicted that the vacuum fluctuations can be cancelled when the half-cavity that has a numerical aperture close to unity even with a distant mirror lying in the far field. For a thesis, with the new set-up , the team will have the opportunity to get close to this regime and to completely control the electromagnetic environment of the coloured center. The quality of the optical system, together with the zero-phonon line linewidth will be characterised at low temperatures and the use of the defect, not only for fundamental quantum optics, but also for quantum communication and metrology will be investigated.</p>
Toutes les rubriques ci-dessous doivent obligatoirement être remplies

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: Non

Lasers, Optique, Matière		Lumière, Matière, Interactions	
Plasmas : de l'espace au laboratoire			

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