

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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Code d'identification :	Organisme :CNRS-UPMC		
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Adresse / address: 2 Place Jussieu, Tour 22-23 , 75005 Paris			
Lieu du stage / internship place: 2 Place Jussieu, Tour 22-23 , 75005 Paris			

Titre du stage / internship title: **Donor-bound electron spin qubit immersed in CdTe quantum wells : Decoherence and entanglement**

Résumé / summary

Owing to the continuous downscaling of semiconductor devices, single dopant atoms are now becoming increasingly important and researched, not only for classical electronics but also in the field of quantum information.

As trapped ions in cold gases, paramagnetic impurities trapped on a semiconductor lattice have uniform properties and relatively long spin lifetimes. In particular, single electrons trapped by individuals donors in semiconductors at low temperatures are promising spin-qubit candidates due to their combination of the advantages of semiconductor and atomic systems. Their semiconductor environment provides a natural localization and ease of fabrication that is absent in atomic and ion qubit systems.

In this context, we study the dynamics of electron spin trapped in Iodine atoms inside CdTe quantum wells, with a pump-probe experimental technique that uses laser pico / femtosecond and allows reading of the optical spin information previously written in the sample by a pump beam. We will focus, in particular, on the creation of coherent superpositions of states of electron spin and on the study of their time- evolution. The aim of the intership is to study the decoherence mechanisms operating in this system as well as possible schemes for spin-qubit manipulation and entanglement or two spin-qubits.

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:ED

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

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