

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 :

Responsable du stage / internship supervisor:			
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Nom du Laboratoire / laboratory name: LTCI			
Code d'identification :	Organisme : Télécom Paristech		
Site Internet / web site:			
Adresse / address:	46 rue Barrault 75013 Paris		
Lieu du stage / internship place:	Paris		

Titre du stage / internship title: Investigation of fluid filled hollow core photonic crystal fibers for Quantum Technologies
Résumé / summary The internship will start with the optimization of an on-going experiment on the generation of photon pairs at telecom wavelength through four wave mixing in a commercial fiber filled with a fluorocarbon liquid. In parallel of the experimental work, finite difference frequency domain simulations are made in order to prepare the design of hollow core fibers that can be fabricated specifically for our applications by our partner GPPMM at XLIM. During the PhD, we propose to design and realize hollow core photonic crystal fibers, that will be filled with a well-chosen nonlinear gas or liquid in order to implement one or more of the following key functions for quantum information : (1) generation of photon pair with controlled spectral correlation ; (2) single photon wavelength conversion through the four-wave-mixing process of Bragg scattering, in order to either interface telecom fiber propagation with the atomic transitions frequency domain where quantum memories, quantum dot single photon emission and avalanche detectors exhibit very good performances or shift the frequency of a photonic qubit inside a given range in order to allow interferences to prove indistinguishability or to change the DWDM channel used for transmission ; (3) triplet photon generation through third-order spontaneous parametric down-conversion, that has never been observed experimentally and would give rise to high quality tripartite entangled states to implement advanced cryptography protocols. This internship is experiments oriented but will also require to do some modeling / simulations. The pre-requisite knowledges are in classical and quantum optics, nonlinear optics and quantum information.
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: ANR, DGA, Région Ile de France (DIM SIRTEQ)			
Lumière, Matière, Interactions	x	Lasers, Optique, Matière	x

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