

Spécialité de Master « Optique, Matière, Paris »

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

Proposition de stage

Date de la proposition : 25/10/2016

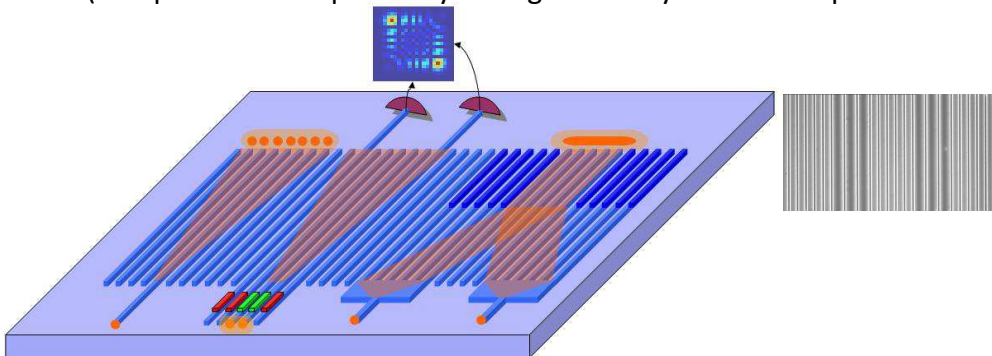
Responsable du stage / internship supervisor:			
Nom / name:	Belabas	Prénom/ first name :	Nadia
Tél :	01 69 63 61 81	Fax :	
Courriel / mail:	nadia.belabas@lpn.cnrs.fr		
Nom du Laboratoire / laboratory name: Centre for Nanoscience and Nanotechnology C2N			
Code d'identification :	UMR9001	Organisme :	
Site Internet / web site:	http://www.c2n.universite-paris-saclay.fr/fr/		
Adresse / address:	Site de Marcoussis Route de Nozay 91460 Marcoussis		
Lieu du stage / internship place:	C2N Marcoussis		

Titre du stage / internship title: **Classical and quantum light circuitry with coupled waveguides**

Résumé / summary

The project aims at building integrated quantum optics demonstrators at $1.55 \mu\text{m}$: Entangled photon sources and quantum state manipulators are to be integrated on the same chip. The demonstrator will be designed and tested in several complementary platforms :

- Lithium niobate (additional partner Ramtech, Romania)
- Silicon (additional partner L. Vivien team, C2N Orsay)
- InP (for specific and exploratory waveguide array based manipulation and with external sources)



Left : Schematics of W state generation and entangled photon pair generation, propagation and correlation detection in waveguide arrays. Right : Functionalized coupled waveguide arrays(InP-InGaAsP, period 5-9 μm)

A complete corpus of classical optics functions of discrete photonics (Guidonics) was recently demonstrated on III-V waveguide arrays in our team, featuring the design and implementation on InP of confinement, redirection and resonating behavior. We now plan to implement novel schemes for quantum states generation and manipulation in coupled waveguide patterns in material which enable on chip generation. Within the framework of 2 recent ANR research grants (Sitqom : Photonics on Silicon for optics and Quantum communication and Incqa : Integrated quantum circuits based on nonlinear waveguide arrays - LMPC and Sebastien Tanzilli are Principal Investigator) state of the art and beyond sources will be integrated on chip. The candidate will perform design and simulation of the structures (Hamiltonian calculations, technological specification and challenges). She/he will participate in the design and construction of an experimental free space and fibered setup featuring high efficiency, fast photon detectors, and integrated as well as self standing single photon and entangled photon heralded sources.

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 of Doctoral school

Lumière, Matière, Interactions	X	Lasers, Optique, Matière	X
--------------------------------	---	--------------------------	---

