

# Spécialité de Master « Optique, Matière, Paris »

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

## Proposition de stage

Date de la proposition : 22/09/17

<b>Responsable du stage / internship supervisor:</b>	
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Courriel / mail: Delphine.morini@u-psud.fr	
<b>Nom du Laboratoire / laboratory name:</b> Centre de Nanosciences et de Nanotechnologies	
Code d'identification :UMR 9001	Organisme :CNRS / Université Paris Sud
Site Internet / web site: <a href="http://c2n.universite-paris-saclay.fr/">http://c2n.universite-paris-saclay.fr/</a>	
Adresse / address: batiment 220, Université Paris Sud	
Lieu du stage / internship place: batiment 220, Université Paris Sud	

<b>Titre du stage / internship title: <u>Characterization of silicon modulators for Radio over fiber (RoF) applications</u></b>
<p>Silicon photonics is an emerging research area, as it profits from mature CMOS technology with high production volume to develop high performance photonic integrated circuits. Actually the main application is driven by data communications, and specifically inside data centers. <b>Data transmission at 40 Gbit/s and more have been demonstrated using silicon photonics-based transceivers and receivers.</b> The progress in the recent years is such that international companies (Luxtera, Melanox,...) are now offering solutions for optical interconnects based on silicon photonics products. Intensive research is now devoted towards the demonstration of multilevel modulation format such as QPSK or PAM modulation format.</p> <p>In parallel, new applications are emerging for silicon photonics, related to <b>Radio over Fiber for wireless access such as 5G communications.</b> Radio over Fiber consists of modulating an optical carrier by analog electrical signal to carry information on the optical fiber. Therefore, wireless signals are optically distributed to base stations directly at high frequencies and converted from the optical to electrical domain at the base stations before being amplified and radiated by an antenna providing wireless broadband access from base stations. The main building blocks for silicon based- Radio over Fiber transceivers have already been demonstrated for digital data communications; <b>however the metrics and figures of merits are different. As main parameters, the linearity of the modulator, and the gain of the opto-RF link have to be evaluated.</b></p>

<b>In this context, the goal of the internship is to evaluate and compare the performances of different architectures of silicon modulators for Radio over Fiber applications.</b>
<p>The research activity will include:</p> <ul style="list-style-type: none"><li>- <b>theoretical study and electro/optical simulations</b> (using commercial software) to evaluate the key metrics of optical modulators</li><li>- <b>experimental characterizations</b> of silicon modulators already developed within the group in collaboration with ST Microelectronics, to characterize the device bandwidth, eye diagrams (OOK and multilevel modulation, Spurious-Free Dynamic Range,...</li></ul> <p>- <b>design of next generation of devices</b></p> <p>The work is done in strong collaboration with STMicroelectronics. During the internship, the student will be actively involved in the current research activity of the group, collaborating with PhD students, postdocs and researchers of different research backgrounds and nationalities.</p>

<b>Ce stage pourra-t-il se prolonger en thèse ? Possibility of a PhD ? : Oui / YES</b>
<b>Si oui, financement de thèse envisagé/ financial support for the PhD: Projet européen / financement école doctorale</b>

Lumière, Matière, Interactions	x	Lasers, Optique, Matière	x
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Fiche à transmettre (fichier pdf **obligatoirement**) sur le site <http://stages.master-omp.fr>