

Spécialité de Master « Optique, Matière, Plasmas »

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

Proposition de stage

Date de la proposition : 09/10/2012

Responsable du stage / internship supervisor:

Nom / name:	MARRIS-MORINI	Prénom/ first name :	Delphine
Tél :	0169157852	Fax :	0169154030
Courriel / mail:	delphine.morini@u-psud.fr		

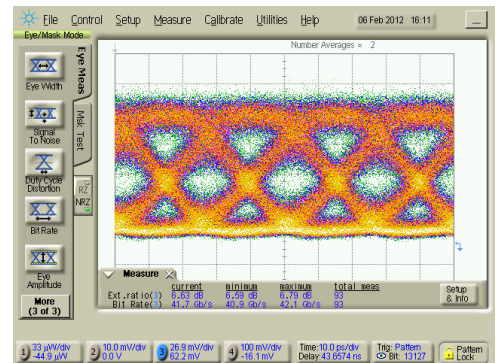
Nom du Laboratoire / laboratory name: Institut d'Electronique Fondamentale

Code d'identification :UMR 8622	Organisme :Université Paris Sud/CNRS
Site Internet / web site: http://silicon-photonics.ief.u-psud.fr/ , http://www.ief.u-psud.fr/	
Adresse / address: Batiment 220, Université Paris Sud, 91405 Orsay	
Lieu du stage / internship place: IEF, batiment 220	

Titre du stage / internship title: **Multilevel modulation in silicon photonics**

Résumé / summary

Silicon photonics is a rapidly growing research area, as it can profit from mature CMOS technology with high production volume. Possible applications are optical interconnects in a microelectronic circuit and optical telecommunications with for example Fiber to the home (FTTH) development. In the last ten years, the possibility to emit, guide or detect light on silicon chip has been successfully shown. As an example we recently demonstrated high performances 40 Gbit/s silicon modulator and germanium photodetector.



In parallel phase-shift-keying (PSK) has attracted considerable attention in previous years because of promising properties, e.g. better Bit Error Rate (BER) at a given optical signal-noise-ratio. Demonstrations of PSK optical emitters have been mainly made using discrete photonic components. However the integration of photonic and electronic circuits is of a great interest to increase the performances and functionalities of transceivers, and will constitute a major technology step towards function integration and very large scale fabrication compatibility.

In this context, the goal of this internship proposal is to participate to the development of multilevel modulation in silicon photonics. A 28Gsymbol/s QPSK silicon modulator is the first demonstrator that we are looking at, but other advanced formats (e.g. 16 QAM) could be also considered and studied. The demonstration of such silicon modulator compatible with standard CMOS/BICMOS technologies is highly challenging, as the voltage swing has to be dramatically reduced down to 1-1.5V while the phase modulation variation still required to be increased (phase modulation of 2π is required instead of π in classical On-Off Keying Mach Zehnder modulators). New concepts for silicon modulators are then required to improve device efficiencies.

The student will work in silicon photonics team at IEF and in the framework of ANR project ULTIMATE, in strong collaboration with Alcatel Lucent Bells Labs, CEA-LETI, 3-5 lab, XLIM and Photline. He/she will be involved in the device simulation (electrical, optical and RF) and/or characterization, to demonstrate multilevel high speed modulator.

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: projet ANR

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Optique de la science à la technologie	x	Plasmas : de l'espace au laboratoire	

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