

Spécialité de Master « Optique, Matière, Plasmas »

Stage de recherche (4 mois minimum, à partir de début mars 2012)

Proposition de stage pour l'année 2011-2012

Date de la proposition : 06/10/2011

Responsable du stage / internship supervisor:		
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Code d'identification :	UMR 8622	Organisme : Paris-Sud / CNRS
Site Internet / web site:	http://www.ief.u-psud.fr/	
Adresse / address:	Bâtiment 220 de l'Université Paris-Sud, 91400 Orsay	
Lieu du stage / internship place:	à l'IEF, département Photonique	

Titre du stage / internship title:

“2D sub-wavelength periodical corrugation of planar optical waveguides: physics and application to the design of new integrated functions ”

Résumé / summary

Integrated silicon nanophotonics has received a strong interest in the last years due to the possibility to integrate many passive and active optical functions on the same chip for different possible applications such as next generations of computers, optical telecommunications, and biophotonics.

We propose here a basic research activity that will try to explore the potentialities of 2D sub-wavelength periodical corrugation made in a semiconductor wafer to control the local effective index seen by the light propagating in-plane, and thus control the light beam profiles and paths following prescribed trajectories. This class of optical materials will then be used to the design of new optical functions.

The first aim will consist in studying the case of a spiral light path. In the envisaged configuration, light loops a large number of times before escaping from a central “attracting” region, in similarity to the action of gravitational forces. As the phenomenon is non resonant, a broadband optical delay is obtained which may have interesting applications.

Preliminary works in this field has been published recently by the group [1]. We will be happy to provide you the pdf version of this paper and discuss with you if you are interested in.

- [1] E. Cassan, K. V. Do
“Analytic design of graded photonic crystals in the metamaterial regime”
Journ. of the Optic. Soc. of Am. B, vol. 28, n°8, pp. 1905-1910, 2011
<http://www.opticsinfobase.org/abstract.cfm?uri=josab-28-8-1905>

Ce stage pourra-t-il se prolonger en thèse ? Possibility of a PhD ? : YES

Si oui, financement de thèse envisagé : Ecole Doctorale / Graduate School			
Lasers et matière	***	Lumière, Matière : Mesures Extrêmes	***
Optique de la science à la technologie	***	Plasmas : de l'espace au laboratoire	