

Spécialité de Master « Optique, Matière, Plasmas »

Stage de recherche (4 mois minimum, à partir de début mars 2010)

Proposition de stage pour l'année 2009-2010 (ne pas dépasser 1 page)

Date de la proposition :

Responsable du stage / internship supervisor:			
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Code d'identification :	UMR 6133	Organisme :	CNRS/Aix-Marseille universités
Site Internet / web site:	www.fresnel.fr		
Adresse / address:	domaine universitaire de Saint-Jérôme, 13013 Marseille		
Lieu du stage / internship place:	Institut Fresnel		

Titre du stage / internship title: Quantitative phase imaging of living cells
Résumé / summary For about 3 years, in close collaboration with a company (PHASICS, Palaiseau, France), but also with immunologists (Didier Marguet's group, CIML, Marseille, France), we are demonstrating the interest in using a high resolution wave-front sensor based on quadri-wave lateral shearing interferometry (QWLSI) [1] for quantitative phase microscopy application. We demonstrated its reliability for phase microscopy, and quantify its accuracy by measuring calibrated test samples [2]. The technique is now applied to living cell imaging, and shows exciting results, because phase images clearly show subcellular structures with a high contrast. The proposed work consists in identifying the nature of the sub-cellular patterns we are able to distinguish with our innovative imaging technique. For that purpose, we would like to simultaneously image specifically marked living cells both in phase and with fluorescence imaging, in order to correlate the fluorescence area with a corresponding phase pattern. The proposed work of this PhD is: (1) To make phase imaging and fluorescence imaging microscopy of living cells (2) To be able to prove the nature of the different sub-cellular structures we can distinguish with the phase imaging technique. (3) To give quantitative results (refractive index, thickness) relative to living cells. The following skills will be developed in the project : Microscopy, cell culture, cell preparation for fluorescence imaging. 1. S. Velghe, J. Primot, N. Guerineau, R. Haidar, S. Demoustier, M. Cohen, and B. Wattelier, "Advanced wave-front sensing by quadri-wave lateral shearing interferometry," in Proceedings of SPIE (2006). 2. P. Bon, G. Maucort, B. Wattelier, S. Monneret, "Quadriwave lateral shearing interferometry for quantitative phase microscopy of living cells", Optics Express 17 (15), 13080-13094 (2009).
Toutes les rubriques ci-dessous doivent obligatoirement être remplies

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: erasmus mundus Doc			
Lasers et matière		Lumière, Matière : Mesures Extrêmes	
Optique de la science à la technologie	x	Physique des plasmas	

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