MASTER DE PHYSIQUE ET APPLICATIONS - 2ème année
Spécialité Sciences des Matériaux et Nano-objets
International Nanomat Master Program

Internship proposal 2009-2010

Laboratory : Optics Laboratory

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Digital-holography techniques in optical microscopy.

Scientific project :

In conventional holography, imaging of an object is performed by recording a hologram on a photographic plate and then producing a (real or virtual) image from the latter, by illuminating it with a suitable reference light beam.
Digital holographic microscopy is a technique exploiting the recent advances in image acquisition (high resolution CCD sensors) and numerical data processing, and apply them to conventional optical holography. In particular, it allows the image of coherently illuminated objects to be obtained starting from the acquired data of the light field scattered from them (combined with a reference field), and numerically backpropagating them up to the object plane.

The evaluated values of the object field are complex, so that both the amplitude and the phase of the transmission function of a transparent object are directly obtained. The process does not require the use of imaging optical elements, such as microscope objectives, so that the recovered image is not affected by optical aberrations and depth-of-field limitations.

Aim of the project is to set up and test a system for digital-holography microscopy to be used with amplitude and phase plane transmitting objects.

Techniques in use :
Mach-Zehnder interferometry, numerical data processing

Applicant skills :
Disposition to experimental work in Optics and data processing

Granted internship : yes
C'nano IdF laboratory (France only) : yes / no
Possibility for a thesis : yes , financial support possible after selection according to national rules.
Amount of the grant: approximately 13640 €/year (previdential contribution shall be deducted).