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

Internship proposal 2008-2009

Laboratory : Optics Laboratory

Address : Dept. of Physics, Università Roma Tre, Via della Vasca Navale 84, I-00146 Rome, Italy

Laboratory director : Prof. Franco Gori

Internship supervisor : Prof. R. Borghi

Phone : +39.06.57337056

e-mail: borghi@uniroma3.it

Optical coherence measurements for partially coherent electromagnetic radiation.

Scientific project :

Second-order correlation properties of a vectorial light field in the paraxial regime are contained in its cross-spectral density (CSD) matrix, whose elements are the correlation functions among the (transverse) components of the electric field. Therefore, the CSD matrix gives information about the spatial coherence of an electromagnetic partially coherent paraxial field, as well as of its local polarization properties.

Knowledge of the CSD matrix of a light field gives, in turn, information about the stochastic characteristics of the source it radiates from. In the particular case of a spatially incoherent light source, the complete space-depending polarization matrix of the latter can be evaluated by Fourier transforming the elements of the CSD matrix of the propagated field.

Experimental determination of the correlation function of a light field in a region is customary performed by means of Young optical interferometers.
In the case of vectorial light fields, the elements of the CSD matrix are obtained by means of suitably adapted Young-type interferometers, allowing the correlation functions among the various field components to be measured.

Aim of the project is to set up and test an interferometer for fully automatized CSD matrix measurements.

Techniques in use :
Young interferometry, numerical data processing

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

Granted internship : yes precise amount / no
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).