

Spécialité de Master « Optique, Matière, Plasmas »

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

Proposition de stage (ne pas dépasser 1 page)

Date de la proposition : octobre 2012

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Code d'identification : UMR 5141	Organisme : CNRS - Télécom Paristech
Site Internet / web site: http://iq.enst.fr	
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Lieu du stage / internship place: 23 avenue d'Italie, 75013 Paris	

Titre du stage / internship title: On-chip quantum key distribution
Résumé / summary
<p>The field of quantum information processing and communications offers the prospect of better and more secure future communications. In the recent years, one of its main applications, quantum key distribution, has been the subject of great progress that has led to the development of commercial systems and to the implementation of the first quantum cryptography telecommunication network.</p> <p>A quantum key distribution protocol that is particularly appealing because it requires only standard telecommunication components and allows high-rate and long-distance communication, is based on the so-called continuous variables and was developed at Institut d'Optique. Indeed, this protocol is solely based on the modulation of coherent light emitted by a laser and on homodyne detection techniques. It has been implemented in an all-fiber prototype and has been used in multiple high-performance experiments at Institut d'Optique and in Télécom ParisTech.</p> <p>The next challenge now is to test the possibility of performing quantum key distribution using integrated circuit technology. This will be an important step towards the wide use of quantum cryptography in every-day applications. The continuous-variable platform is an ideal candidate for such a miniaturized approach because of the simplicity of its implementation. In the context of an exploratory project in this direction, which involves Télécom ParisTech, Institut d'Optique and the University of Delaware in the US, we will pursue within the next few months initial proof-of-principle experiments of on-chip quantum key distribution using continuous variables.</p> <p>The proposed internship is situated in this highly innovative perspective. We expect to have the first integrated circuit samples developed by the University of Delaware in the beginning of the internship, and to perform the experiments using the appropriate driving equipment in the experimental lab in Télécom Paristech.</p> <p>The internship is primarily of experimental nature and may lead to a PhD in this or a related subject starting from Fall 2013 subject to appropriate funding. Both the internship and the PhD will be co-supervised by Eleni Diamanti (LTCI, CNRS – Télécom ParisTech, eleni.diamanti@telecom-paristech.fr) and Philippe Grangier (LCFIO, CNRS – Institut d'Optique – Université Paris-Sud, philippe.grangier@institutoptique.fr).</p>
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: Institut Mines/Télécom, Région Ile-de-France, CNRS			
Lasers et matière	X	Lumière, Matière : Mesures Extrêmes	
Optique de la science à la technologie	X	Plasmas : de l'espace au laboratoire	

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