PhD offer in Polarimetric Imaging

PhD title

Polarimetric imaging with microwave-photonics approaches

Experimental developments & advanced processing of spectro-polarimetric images

Funding

PhD: PhD grant acquired (French Defense Agency DGA) (3 years: 2014-2017) ~ 1650€/mois

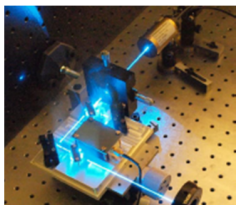
Subject

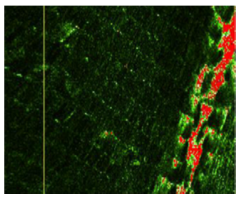
Associating microwave-photonics approaches and optical imaging systems makes it possible to develop new imaging modalities which are not accessible with standard imaging techniques. Recently, a new concept of depolarization sensing by "orthogonality breaking" has been proposed by the Institut de Physique de Rennes (IPR) [1,2]. Such technique paves way for remote polarimetric imaging through optical fibers (endoscopy) [1,2] and for real-time long-range active spectro-polarimetric imaging [1], thus representing a strong interest for biomedical, teledection, or military applications (target detection/classification).

The main objective of this Msc thesis/PhD offer is to develop endoscopic imaging devices based on this original principle, and offering a high polarimetric sensitivity for biomedical applications [2] and also real-time long-range polarimetric measurements with unprecedented sensitivity in comparison to existing multispectral polarimetric imaging systems.

Once validated these potentialities on experimental setups, the student will have the opportunity to get involved in advanced signal/image processing of "orthogonality breaking" polarimetric signals and/or spectro-polarimetric signals, which remain an important field of investigation with numerous applications in target detection/classification.The theoretical developments carried out during this work will be fed by original experiments involving micro-wave photonics equipments available in the laboratory.

[1] M. Alouini et J. Fade, Patent FR11.5552 (2011).
[2] J. Fade and M. Alouini, Phys. Rev. Lett., 109, 043901 (2012).
[3] J. Fade, E. Schaub, M. Alouini, OPTRO 2014, Paris (2014).





Laboratory

Institut de Physique de Rennes, Université de Rennes 1, CNRS
Optics & Photonics Departement *http://www.ipr.univ-rennes1.fr*

Partnerships

Institut Fresnel (Marseille, France) – MaunaKea Technologies (France)
This PhD is within a research contract National Research Agency/Defense Agency.

Required formation

Msc in Physics and/or Signal/Image processing

Skills

Good skills in **optics** and **signal processing** are required.
Knowledge in microwave electronics will be appreciated.
Programming languages: Matlab, Labview.

Contacts

Julien FADE julien.fade@univ-rennes1.fr – 0223235215 / Mehdi ALOUINI mehdi.alouini@univ-rennes1.fr

Application

Please send **CV**, **marks**, **copy of diplomas** & **contact of Msc director.**
Caution: for the grant acquired, nationality & age conditions apply **(EU/Swiss citizen < 27 years old)**

M2 training period possible (with grant) before PhD during 1st sem 2014.