

PhD OFFER

Title : Radar Absorbing Metamaterial

Reference : **DEMR-2016**

Host Lab at ONERA :

Branch : Physics

Location : Palaiseau (91), France

Department : Electromagnetism & Radar (DEMR)

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Abstract: ONERA-DEMR is taking a keen interest in metamaterials, *i.e.*, artificial materials structured on the sub-wavelength scale, due to their potential as Radar Absorbing Materials (RAM). For certain frequency ranges, most notably those below 1 GHz, metamaterials with embedded electronics offer numerous advantages (performance, weight, cost). In the last few years, several projects have highlighted the necessity to seriously consider solutions beyond simple passive components (resistors, inductors, capacitors), *i.e.*, including more sophisticated active components (diodes, transistors, integrated circuits). Such components are required to improve performance of existing devices, for example RAM's bandwidths, as well as put in practice novel stealth concepts, most notably invisibility cloaks.

However, integration of active components presents real scientific and technological challenges. This PhD thus aims to investigate one or more solutions to answer those challenges. Two main avenues are envisioned: a hybrid solution (passive-active) or a fully active one (to be defined). Fabrication and measurement of prototypes are an integral part of the PhD's work. The aim of this PhD is to obtain a state-of-the-art prototype.

This PhD requires a solid background in electromagnetism. Numerical simulations as well transmission line models will be elaborated. A basic knowledge of analog electronics is also needed. Prior experience with RF measurements techniques is a plus.

Collaborator(s) : Emilie Avignon (CentraleSupélec/GEEPS/ECO2)

REQUIREMENTS

Degree : Master in electrical engineering

Keywords : Electromagnetism, RF, microwaves, electronics

Other: *Due to the nature and location of the PhD, EU citizenship is mandatory*