IETR

PhD Offer

Sub-THz Programmable Electromagnetic Surfaces with Integrated Phase Change Materials

General context

Artificially-engineered metasurfaces (MSs) represent extremely promising solutions for wave manipulation at sub-THz frequencies, for a plethora of applications like ultra-high data-rate wireless communications, sensing, or imaging. Such surfaces are composed of subwavelength meta-atoms or unit-cells arranged in a (quasi-)periodic array. When illuminated by a space wave, such surfaces serve as phase-correcting devices, enabling the formation of collimated beams with desired patterns in both the near and far-field regions. They can also be exploited for polarization manipulation or multi-frequency beam shaping. Their programmable counterparts also enable dynamic beam steering using advantageously advanced technologies as CMOS, Phase Change Materials (PCM), liquid crystal, Schottky diodes, or GaN.

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Objectives

The research objective is to study, design and characterize programmable electromagnetic surfaces with integrated PCM, at sub-THz (D-band). These activities include:

- The design and characterization of passive unit-cells and passive artificially-engineered metasurfaces,
- The design of PCB-based unit-cells accounting for technological fabrication constraints,
- The fabrication and characterization of several prototypes.

Expected candidate profile

Required education level: Master degree or equivalent degree in electrical engineering or physics, with a specialization in Electromagnetism, Antennas, Microwaves, High Frequency Electronics, and/or Wave Physics. A strong knowledge in antenna design and in the use of commercial electromagnetic softwares.

Required background: antenna theory, microwave engineering, antenna arrays, periodic structures. Proficiency in written and spoken English (knowledge of French is not required).

Information to apply

- The call for applications is open until **April 30, 2026**.
- Candidates must send a detailed CV, a motivation letter, their academic transcripts (bachelor and master degree), and the contacts of at least two professional referees to:
  - David GONZALEZ-OVEJERO, <david.gonzalez-ovejero@univ-rennes.fr>
  - Ronan SAULEAU, <ronan.sauleau@univ-rennes.fr>
- *Uncomplete applications will not be considered*.