

## **Micro-fabrication / integration / test of BST based varactors for 5G antenna**

### **Job summary :**

GREMAN is opening a postdoc position to focus on the micro-fabrication of BST based varactors and their integration into 5G antenna prototype in collaboration with Jaybeam wireless within the scope of BePolar ANR project. The micro-fabrication of the varactor will be based on an optimised commercial process.

### **Job description :**

The objective of the BePolar project is to develop and optimise BST ( $\text{Ba}_{1-x}\text{Sr}_x\text{TiO}_3$ ) based ferroelectric varactors, i.e. tunable capacitors relying on the electric field dependence of BST's permittivity, to meet the requirement of 5G and NFC technologies. BST varactors are currently being used in 4G mobile phone applications. Going to 5G or NFC applications requires to work at higher frequency (>2 GHz) or reduced driving voltage (3V instead of 24V). To do so, the thickness of the ferroelectric layer needs to be reduced in order to push the piezoelectric resonance to higher frequencies or maintain the electrical field amplitude respectively. However, this reduction of thickness leads to an increase of the leakage current and a decrease of the tunability, both of them are unacceptable to keep reliability and usability of the component. The strategy of the BePolar project is to introduce an additional nanometric control layer between the electrodes and the BST ferroelectric material to tune the Schottky Barrier Height and reduce the interfacial ferroelectric dead layer, responsible of the decrease of the varactor performances. The development of the control layer has been done and stack optimisation is currently being fine-tuned. We are now seeking a Postdoc scientist to micro-fabricate varactor components using this refined stack in order to evaluate their performances once integrated into a prototype 5G antenna.

During this postdoc position, your mission will be :

- Micro-fabrication of the BST based varactor following an already optimised process and the initial layout used for commercial 4G varactors applications
- Optimisation of the layout to meet the antenna requirements in collaboration with Jaybeam wireless
- Participate to the prototype 5G antenna evaluation conducted by Jaybeam wireless

All the equipment required for this project are available at CERTeM technological platform (<http://certem.univ-tours.fr>), which is a fully equipped clean room facility and an electrical/physical characterization laboratory, hosted by STMicroelectronics Tours.

**Nr of positions available : 1**

### **Main Research Field :**

Physics, Electronic, Condensed Mater

**Career stage :** Experienced researcher (4-10 years)

**Research profiles :** R2 or R3

### **Candidate profile**

You will have a PhD in Microelectronics, or material science & engineering

You have a good knowledge of fabrication process commonly used in microelectronics (photolithography, sputtering, e-beam evaporation, ...) and in structural characterization (MEB, XRD...).

An experience in electrical engineering and high frequency measurement would be particularly welcome.

**Location :** At GREMAN beside STMicroelectronics site with easy access to the CERTeM platform. Tours is located at 230 km south from Paris, France.

**Address :** 16 rue Pierre et Marie Curie, 37100 TOURS, FRANCE

### **Job Details :**

**Type of Contract :** Permanent / Temporary / ~~To be defined~~ / Other

**Status :** Part time / Full Time / ~~Negotiable~~ / Other

**Working Hours (hours per week or free text)** (mandatory only for full-time and part-time status) : 35

**Science4Refugees [Link](#) :** Yes

### **Organisation / Institute Contact Data**

**Company/Institute :** GREMAN (UMR CNRS 7347) / STMicroelectronics site

**Country :** France

**City :** Tours

**Postal Code :** 37100

**Street :** 16 rue Pierre et Marie Curie

**E-mail :** [kevin.nadaud@univ-tours.fr](mailto:kevin.nadaud@univ-tours.fr)

**Website :** <http://greman.univ-tours.fr/>

**Starting period:** october 2023, for one year (other Postdoc positions will open end of 2024)

**Salary:** about 2600€ monthly gross salary, corresponding to about 2100€ after social taxes deductions