Position: **post-doctoral fellowship at GREMAN (Tours University)**
Starting date: **As soon as possible**
Topic: ***electrical characterizations of GaN power devices***

Wide band-gap semiconductors (SiC, GaN) are the subject of intensive research and development activities. This growing attention is motivated by attractive material properties which make silicon carbide and gallium nitride promising materials for high power and high temperature electronic devices. GaN can be heteroepitaxially grown on silicon substrates even though the lattice mismatch is still high. The capability to grow the material on low cost and large diameter silicon substrates becomes then an extremely attractive solution for manufacturing. On the other hand, GaN bulk material starts to be available offering an alternative to SiC for some higher voltage applications. In this framework, power High Electron Mobility Transistors (HEMT) as well as Schottky barrier diodes (SBD) and p-n junction diodes have nowadays broad developments.
Since many years, GREMAN has developed known-how in GaN processing and characterization (Physical and Electrical) for industrial power applications. It is also to note that HEMTs and SBD generally require AlGaN/GaN heterostructures when using lateral structures and that AlScN/GaN heterostructure is developing fastly. In the case of vertical GaN SBD other material solutions are possible, often requiring the addition of p-type GaN layer. Such layer can also be used in lateral devices to increase their reliability.
In this work, we propose to study GaN power devices and technologies that will be developed in the framework of the GaN4AP European project to better understand the impact of both materials and process steps on devices. Power device generally employ junction termination to ensure the maximum blocking voltage. Heavily doped guard rings are requested. A complete study of the efficient doped zone and associated contacts is ongoing at GREMAN.
To ensure the realization of efficient junctions or doped zones, electrical characterizations is essential. In wide band gap material, the common electrical dopant profiling techniques are not suitable while the availability of 2D reliable dopant profiling is a key tool to understand junction formation and try to avoid failure in devices. These characterizations are hence a key issue for the development of devices in such materials and will be the aims of the work developed here.

Background:
The candidate must have a doctoral degree in SC physics, material science or electronics, ready for teamwork. Knowledge in semiconductors is essential, especially wide band-gap materials. Excellent background and practice in both electrical and physical characterization techniques. Probe station measurements (I-V(T) and C-V(T)) and their exploitations for material feedback is needed. The candidate must have knowledge in AFM technique, especially electrical mode (SCM, SSRM, …).
This work will be done in the framework of a national project and the European project ECSEL-H2020 GaN4AP in close cooperation with project partners both academic (CNR-IMM, CRHEA, FhG) and industrial ones (here in particular, STMicroelectronics).
To apply for this position, a CV and a cover letter including date available to start, the names of three references are mandatory.
Contract Duration : 1 year (renewable 1 Year)

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