# Master thesis proposal in Materials for Microelectronics and Nanotechnologies

**GREMAN Laboratory, technological platforms**
**CERTeM (STMicroelectronics site), Tours, France**

**Subject :** Realization and characterization of ohmic contacts on GaN

**Internship description :** Structures based on Gallium nitride (GaN) are very promising for power electronics because this wide energy bandgap semiconductor material induces a drastic reduction of energy losses inherent to power conversion. They are widely used to manufacture new power devices architectures (diodes and High Electron Mobility Transistors (HEMTs)), where the use of ohmic contacts is a crucial point to obtain good performances.

The main objective of this internship is to develop the contact on p-type GaN material. It is a major scientific challenge to find experimental conditions compatible with an industrial environment and which will allow to realize the most ohmic contact possible on a p-type GaN layer.

Within the framework of the project, the trainee will be in charge of the realization and the characterization of a high performance ohmic contact on GaN. The student will be trained and gain a good knowledge in fabrication (thin films contact materials deposition by sputtering and evaporation, lithography, etching, thermal treatment...) and characterization (structural and electrical) of the interfaces between the different thin films in a clean room environment.

The steps of the project are :

- A state of the art will be established based on an in-depth study of the literature concerning diode structures and ohmic contacts on p-type GaN.
- Optimization of the elementary steps of the technological process/conditions of thin film deposition and evaluation of the most ohmic stacks.
- Realization of an ohmic contact and characterization of the structures by conventional tools (X-ray Diffraction (XRD), Scanning Electron Microscope (SEM), Atomic Force Microscope (AFM), electrical measurements).

**Required profile :** Master 2 or last year in engineering school with a major in materials science and microelectronics. The candidate will have knowledge of semiconductor physics, microelectronics processes (thin film deposition, photolithography, etc.), structural (XRD, SEM) and electrical (AFM, resistivity measurement, etc.) characterizations, and the techniques required for electrical work.

This internship work can be pursued by a doctoral thesis for a competent and motivated candidate.

**Conditions :**

- Paid internship for a period of 5-6 months
- Location: GREMAN laboratory in Tours, on the site of the CERTeM technology platform. 16 rue Pierre et Marie Curie, 37100 Tours, France. We have a fully equipped clean room for the fabrication and characterization of electrical components
- Possible start : February / March 2022

**Application :** The application file must include a detailed CV and a cover letter. All documents should be sent to the persons mentioned below :

taoufik.slimani@univ-tours.fr et daniel.alquier@univ-tours.fr

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