Institute of Microelectronics of Barcelona IMB-CNM CSIC

The **IMB-CNM** is the largest institute in Spain dedicated to the research and development of Micro and Nano Technologies and Microsystems and with unique capabilities in silicon technology. It belongs to CSIC since its foundation in 1985 and is distinguished as a María de Maeztu Unit of Excellence.

IMB-CNM aims to contribute to the advancement of knowledge and to the economic and social development of society, as well as to the training of researchers and engineers and to the advice to public and private entities.

The research activities of IMB-CNM are dedicated to Micro/Nano Integrated Systems: miniaturized electronic systems which include sensing and/or actuating capabilities in addition to electronic information processing, power management and external interfaces.

The IMB-CNM is located on the Autonomous University of Barcelona (UAB) Campus and contains the largest clean room facilities in Spain with full capability to process its own CMOS technologies and laboratories.

Project Type: TFG/TFM

Project Title: Alpha particle detection with ultrathin silicon, silicon carbide and gallium nitride radiation detectors

Research Group: Radiation Detectors Group (RDG)

Project Description:

- Alpha particle detection is used for a wide range of applications across industry, medicine, space exploration and high energy physics experiments. Despite their short penetration range, alpha particles are powerful ionizers, and that makes them incredibly useful for the above fields.
- The Radiation Detectors Group (RDG) of IMB-CNM (CSIC) has developed in recent years different technologies of devices including innovative ultrathin silicon, silicon carbide and gallium nitride radiation detectors.
- This TFG/TFM proposal aims to study the functional operation of some of these innovative radiation detectors for alpha particles detection.

Work Plan:

- The proposed work will include a state of the art study on the research topic, experimental techniques for detector characterization (physical, electrical and radiation detection), possible access to cleanroom facility inspection tools (3D optical profiler, FIB, SEM, EDX, AFM, …), device characterization with alpha particles set-up (signal response, collected charge), studying the different specificities for the different devices, with the aim to propose and implement improvements in the alpha particles set-up (source-sample distance control, effect of vacuum, etc.) and collect and interpret relevant data in order to make statements for scientific research (the results of this research are envisaged to contribute to some possible scientific publication).
- The Radiation Detectors Group (RDG) at IMB-CNM-CSIC devotes its research to the development of technologies and applications of radiation detectors based on semiconductor substrates. The fields of application of these developments are: high energy physics experiments, nuclear physics experiments, instrumentation for synchrotron facilities, security systems, instrumentation for satellites, dosimetry and instrumentation for medical imaging. The group has its own laboratory (LabRad), equipped with numerous

equipment and instruments to electrically characterize semiconductor radiation detectors. The RDG has collaborated with more than 100 different groups and entities from all over the world, including universities, research centers and private companies.

- The RDG makes extensive use of the Micro and Nano Fabrication Clean Room (SBCNM) for the manufacture of radiation sensors tailored to the needs of each application. The SBCNM is 1500 m2, class 100/10000 (ISO 5/7) (plus 4500 m2 for services), has more than 150 high-tech instruments inside and is complemented by another 350 m2 of electrical characterization and back-end laboratories. The SBCNM is a Singular Scientific and Technological Infrastructure (ICTS) dedicated to the development and application of innovative technologies in the field of Microelectronics together with other emerging Micro/Nanotechnologies.

Candidate desired studies:

- ✓ MSc in Semiconductor Engineering and Microelectronic Design
- ✓ MSc in Nanoscience and Nanotechnology
- ✓ BSc in Nanoscience and Nanotechnology

Application Process:

Before applying, please **check with your TFG/TFM program supervisor,** as he/she may already be coordinating with us to assign the project.

If there is no such coordination**, complete this form and send your CV and a motivation letter** to **Talent@imb-cnm.csic.es**, with the **subject: "TFG/TFM at IMB-CNM"**

Your CV will be forwarded to the Researcher leading the project who will contact you directly if interested.

Check our website for more information about the IMB-CNM and our research activities

https://www.imb-cnm.csic.es/en

Take the next step in your research career with us!

*By applying, you accept our data protection policy.

**IMB-CNM (CSIC) adheres to the European Charter and Code of Conduct for Researchers, ensuring full alignment with their principles and requirements, including equal opportunity, transparency, merit and ability, caring for an open, fair, and excellence-based hiring processes.

IMB-CNM holds the HR Excellence in Research award, which acknowledges CSIC's commitment to continuous improvement in HR strategies for researchers.

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