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: TFM

Project Title: Modelization of the technological process for advanced particle detectors fabricated at the IMB-CNM

Research Group: Radiation Detectors Group (RDG)

Project Description:

- Low Gain Avalanche Detector (LGAD) is one of the most promising sensors technologies for the next generation of particle tracking detectors, which target at the combination of fine spatial resolution with accurate timing information. IMB-CNM pioneered the fabrication of LGADs and is nowadays pushing forward its technology to reach the challenging demands of the new tracking detectors for high energy physics experiments and medical applications.
- One of the key aspects in the future developments lies in achieving a consistent and reliable modelization of the process technology, which allows for clear a identification of the fabrication issues, the anticipation of potential hindrances and the proposition of suitable technological solutions.
- This TFM proposal looks for a Master student willing to learn about the physics below the fabrication process. The candidate will help the group researchers in fine tunning the existing models in contrast with the experimental results.

Work Plan:

The master student will acquire a deep insight in the technological simulation techniques (TCAD simulations) and the physics models behind the fabrication process. The work is mainly oriented towards simulation, but we will complement the formation with hands-on involvement on the fabrication in the clean room and the device characterization in the lab.

Orientative work plan:

- Understanding of the LGAD fabrication process and the physics models for its simulation
- Formation on simulation techniques (synopsys Sentaurus TCAD)
- Identification of the key aspects adjust the simulation models
- Proposal of new parametrization (or even new models) in contrast with the literature

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- Comparison with experimental results and fine tuning of the simulation models

Candidate desired studies:

- ✓ MSc in Semiconductor Engineering and Microelectronic Design
- ✓ MSc in Telecommunications Engineering
- ✓ MSc in Biomedical Engineering

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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