

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: Continuous Variable Integrated Quantum Photonics

Research Group: Integrated Photonics

Project Description:

- ❖ Quantum information technology has the potential to offer disrupting solutions that outperform classical communication, computing, and sensing applications. One of the most versatile and promising technological platforms for the implementation of quantum information processes is integrated photonics using a continuous variables encoding. In these cases, quantum information can be encoded, manipulated and detected deterministically using squeezed states of light. Squeezing light is a very technically challenging process that requires the optimisation of the system, balancing linear and non-linear optical loss, the purity of the optical modes and the stability of the source of light.
- ❖ This project will target the numerical simulation of the process in a range of integrated photonic components, and will incorporate real-world data from existing materials to extrapolate performance bounds.

Work Plan:

- The student will carry their research within the Integrated Photonics team at IMB-CNM, leveraging the resources of the PIXEurope consortium.
- The project will combine design and simulation tools (Lumerical, COMSOL, GDSFactory...) as well as custom-devised code in python to explore quickly the whole space of solutions for the photonics technology of IMB-CNM.

Candidate desired studies:

- ✓ MSc Quantum Science and Technologies
- ✓ MSc Research and Innovation in Computer based Science and Engineering
- ✓ MSc Photonics

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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.