

Tutor: Ignasi Fina

Grupo: Ignasi Fina

Lugar: Institut de Ciència de Materials de Barcelona (ICMAB-CSIC), Carrer dels Til·lers sn. Campus UAB, Bellaterra 08193; Catalonia; Spain

Título: Development of new materials for neuromorphic computing

Descripción del proyecto: Computing as we know it today is doomed to disappear. New paradigms of quantum computing or emulating the human brain are being developed, so new materials are needed. Among the research being carried out for the development of materials to be integrated into neuromorphic computing devices are ferroelectric materials. The information in this type of material can be stored in the form of an electric charge state. This state can be "read" by resistance measures. The relationship between the state of electric charge and resistance is given by the band diagram of the material. It is for this reason that research becomes essential. The aim of the project is to investigate the band diagram in ultra-thin layers (<5 nm) of potentially industrially integrable ferroelectric materials. The student will perform tasks and develop activities in the field of material growth. This includes structural, morphological, and electrical characterization. The project also includes computing tasks. Finally, the student will train skills in data analysis, summary generation and presentation of results. The PhD will integrate a group with students and researchers with diverse expertise and aims. The project will also be integrated in ongoing collaborations with MIT (USA), University of Cambridge (UK), and others. The thesis will be supervised by Ignasi Fina (<https://scholar.google.com/citations?user=e0qqw3YAAAAJ&hl=ca>) with an intensive production and several on-going projects regarding the topic during the last years.