

Molecular Beam Epitaxy (MBE) Scientist/Engineer

Summary

The Physics and Engineering of Nanodevices (PEN) group (Catalan Institute of Nanoscience and Nanotechnology, ICN2) is seeking to appoint a creative and motivated Scientist/Engineer to develop and deliver Molecular Beam Epitaxy (MBE) solutions. The appointed candidate will be responsible for performing epitaxial growth and characterization of semiconducting compounds and heterostructures. The compounds include topological insulators (TI) of the $(\text{Bi,Sb})_2(\text{Se,Te})_3$ family of materials and transition metal dichalcogenides (TMDC). S/he will carry out process development, documentation of processes and implement the necessary maintenance of growth-lab and ancillary equipment. S/he will interface with the other PEN members, focused on (electronic) devices that use the grown heterostructures, and with Laboratory Engineers that are in charge of the common facilities at the ICN2. The latter include x-ray diffraction (XRD), x-ray photoelectron spectroscopy (XPS), angle-resolved photoemission spectroscopy (ARPES), and scanning and transmission electron microscopy.

The position will be funded by a European FET-Proactive project coordinated by Prof. Sergio O. Valenzuela, leader of the PEN group. The appointment is initially for a period of 2 years with a possibility of extension.

Job Duties and Responsibilities

- MBE growth of $(\text{Bi,Sb})_2(\text{Se,Te})_3$, transition metal dichalcogenides, and heterostructures based on these materials and metals/insulators.
- Development and optimization of growth recipes, incorporating the feedback from the PEN team members who characterize the films electrically.
- Documentation of growth run, characterization data and processes.
- Maintenance, troubleshooting and development of the multi-camber MBE cluster and ancillary equipment.
- Performing characterization of the heterostructures, including RHEED, XRD, XPS and ARPES (with the assistance of the responsible Laboratory Engineer).
- Collaboration with, and MBE training of, PEN researchers in the correct use of growth tools.

Qualifications and Experience

Bachelor or above in Physics, Material Science or semiconductor related Engineering field. Minimum 2+ years for MS and 3+ years for bachelor of relevant work experience is required. Ultra-high vacuum and MBE growth experience and an establish track record of successful project execution for R&D activities are mandatory. Experience in XRD, XPS and

ARPES analysis and familiarity with control system hardware and software will be highly valued. The applicants must show motivation, independence, excellent disposition towards challenging problems, attention to detail, a good level of the English language and ability to prepare and present progress reports at the PEN group meetings.

Application

To apply, please fill in the form at <https://jobs.icn2.cat/job-openings/154/molecular-beam-epitaxy-mbe-scientistengineer>. Review and Interviews of candidates will start immediately and continue until the position is filled. Applicants should submit a short Cover Letter, a CV and contact information for at least two references.

About ICN2 and PEN

The ICN2 is an interdisciplinary Research Institute focused on Nanotechnology aspects of ICT, Energy and Biomedicine. It comprises 17 Research Groups and 3 Support Divisions (Microscopy, Instrumentation, and Nanomaterial Growth) with about 200 active researchers. The ICN2 is in the main Campus of the Autonomous University of Barcelona, in a building inaugurated in 2013, which is located 30 minutes north of downtown Barcelona.

The PEN group led by ICREA Prof. Sergio O. Valenzuela counts with about 10 members, including senior researchers, postdoctoral fellows, and PhD students. The group carries out both basic research and nanomaterial engineering for electronic nanodevices applications. Current focus is on spin physics in two-dimensional materials, including graphene, TMDCs and TIs, thermoelectricity and quantum information. For more information on the institute and PEN group activities and recent publications, refer to <http://www.icn2.cat> and <http://nanodevices.icn2.cat>.

The PEN MBE cluster comprises two growth chambers and an XPS/Auger/sample prep system. The first growth chamber, which is equipped with RHEED, is dedicated to TIs and TMDCs, the second chamber, with tilting stage, is dedicated to insulating materials (MgO, EuS), and metals (Al, Ag, NiFe, Co,...). The cluster has a docking port for a UHV suitcase to transfer films to/from the ALBA synchrotron (1km away) and other in-house equipment (XPS, LEED, STM, ARPES, pulsed laser deposition cluster).