

ICN2 is a renowned research centre. Its research lines focus on the newly discovered physical and chemical properties that arise from the behaviour of matter at the nanoscale.

The Institute promotes collaboration among scientists from diverse backgrounds (physics, chemistry, biology, and engineering) to develop basic and applied research, while seeking out new ways to interact with local and global industry.

It also offers researchers training in nanotechnology, develops numerous activities to promote and enable the uptake of nanotechnology by industry, and promotes networking among scientists, engineers, technicians, business people, society, and policy makers.

ICN2 was accredited in 2014 as a Severo Ochoa Centre of Excellence and is a founding member of the Barcelona Institute of Science and Technology (BIST). The aim of the Severo Ochoa Program, sponsored by the Spanish Ministry of Economy, Industry and Competitiveness, are to identify and support those Spanish research centres that demonstrate scientific leadership and impact at global level.

## **Job Title: Molecular Beam Epitaxy (MBE) Scientist/Engineer**

**Research area or group:** Physics and Engineering of Nanodevices Group

### **Description of Group/Project:**

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).

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.

### **Main Tasks 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.

### **Education, Experience, Knowledge and Competences required:**

Education: 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.

Knowledge: 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.

Competences: 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.

### **Summary of conditions:**

- Full time work (37,5h/week)
- Contract Length: 3 years.
- Salary will depend on qualifications and demonstrated experience.
- Salary according to the cost of living in Barcelona.
- Support to the relocation issues.
- Life Insurance.

Estimated Incorporation date: As soon as possible.

### **How to apply:**

All applications must be made via the ICN2 website <http://jobs.icn2.cat/job-openings/154/molecular-beam-epitaxy-mbe-scientistengineer> and include the following:

1. A cover letter.
2. A full CV including contact details.
3. 2 Reference letters or referee contacts.

Deadline for applications: Review and Interviews of candidates will start immediately and continue until the position is filled.

### **Equal opportunities:**

ICN2 is an equal opportunity employer committed to diversity and inclusion of people with disabilities.