

The Nanoscience Cooperative Research Center, CIC nanoGUNE, located in Donostia / San Sebastian, Basque Country (Spain), is currently looking for a

PRE DOCTORAL RESEARCHER

to work on

Engineering Quantum States in Molecular Architectures

We offer a **PhD position** in Molecular Quantum Physics, oriented to the nanoscale investigation of quantum states of molecules using low-temperature scanning tunneling microscopy. The research **project aims** to synthesize molecular nanostructures that exhibit collective electronic, optical, or magnetic quantum states. This new class of materials has a strong potential for elementary quantum operations. Therefore, the project also will develop protocols for manipulating the collective modes with electrons and photons.

This project involves the following **activities**:

- Fabricate graphene nanostructures through steered reaction on metal surfaces, implementing protocols for creating tailored geometries using the on-surface synthesis technique.
- Employ state-of-the-art STM techniques to probe and characterize the electronic, optical, or magnetic properties at low temperatures.
- Utilize advanced single-molecule spectroscopy techniques to study and manipulate their quantum states.
- Process and analyze the experimental data obtained from STM and single-molecule spectroscopy measurements.
- Extract relevant information about electronic excitations, spin localization, optical coupling, coherence, and other properties
- Develop theoretical models and simulations to interpret the experimental results and gain deeper insights into the underlying physics.

The candidate will join an international and multicultural research team focusing on molecular physics, nanoscale optoelectronics, and superconductivity in low dimensions. More information can be found at <https://www.nanogune.eu/en/research/groups/quantum-probe-microscopy>.

The **successful candidate** is expected to hold a Master's degree (or equivalent) in Physics, Materials Science, Nanotechnology, or a related field; to have demonstrated background in experimental condensed matter physics, nanoscience, or a closely related discipline, and programming skills and experience with scientific software packages (e.g., MATLAB, Python) for data analysis and simulation. Previous experience with scanning tunneling microscopy (STM), low-temperature experimental setups, or single-molecule spectroscopy will be advantageous. Additionally, the candidate should demonstrate excellent written and verbal communication skills in English, including the ability to present research findings effectively.

We promote teamwork in a diverse and inclusive environment and welcome all applicants regardless of age, disability, gender, nationality, race, religion, or sexual orientation.

The position is expected to **start** on **01/10/2024** in the Quantum-Probe Microscopy Group. The contract will be **funded by the Spanish Research Agency**, in the framework of a Spanish collaborative research project.

Candidates should **apply** by completing the **form below** and attaching the following documents grouped in a single PDF file:

- a. A complete CV
- b. A cover letter, stating research interests, and at least two reference letters

The **deadline** for applications is **31/08/2024**.

NOTES:

(i) All applicants will receive an answer after the end of the selection process; but please note that due to the large number of submissions that are expected, we cannot provide individual feedback.

(ii) Additional information about nanoGUNE's commitment towards HR excellence in Research and Gender Equality are available on our website.

(iii) We encourage you to subscribe to our HR mailing list to receive information related to nanoGUNE's open positions and open calls for different training and talent attraction programs.