



CALL FOR APPLICATIONS - October 2022

Research Assistant Position

Donostia International Physics Center (DIPC) is currently accepting applications for PhD positions. This is a unique opportunity for highly motivated students, recently graduated from the university in Physics or related fields, to join one of DIPC's high-profile research teams. A description of each of the available openings, contact information and deadlines can be found on the following pages.

Although candidates are welcome to contact the project supervisors to know further details about the proposed research activity, please be aware that the application will be evaluated only if it is submitted directly to the email address listed as "application email".

Applications received by the deadline will be evaluated by a Committee designed by the DIPC board on the basis of the following criteria:

- CV of the candidate (60%)
- Adequacy of the candidate's background to the project (20%)
- Reference letters (10%)
- Other: Diversity in gender, race, nationality, etc. (10%)

Evaluation results will be communicated to the candidates soon after. Positions will only be filled if qualified candidates are found.

The DIPC may revoke its decision if the candidate fails to join by the appointed time, in which case the position will be awarded to the candidate with the next highest score, provided it is above 50 (out of 100).

However, the selected candidate may keep the position if, in the opinion of the Selection Committee, the candidate duly justifies the reasons why he or she cannot join before the specified deadline, and as long as the project allows it.

Ref. 2022/67
Topological superconductivity

Supervisor(s):

Deung-Jang Choi (djchoi@dipc.org)
Nicolas Lorente (nicolas.lorente@ehu.eus)

Duration*: 1 year

Application Deadline: 05/10/2022

Application Email: jobs.research@dipc.org

When a magnetic atom or molecule is placed in a superconductor, magnetic interactions locally destroy the superconducting state, giving rise to states of a particle inside this superconductor band gap. This leads to the possibility of changing the superconductor properties locally, hence leading to a superconducting-gap engineering.

The project is to perform quantum computing using magnetic atomic nanostructures on superconducting surfaces. When you put a chain of atoms with interatomic distances on the order of the superconductor lattice parameter, you can create bands of single-particle states that begin pairing by the remaining interactions of the superconductor, leading to the creation of a new superconductor inside the initial superconductor. In the presence of spin-orbit interactions and a strictly one-dimensional structure (a chain of atoms), different topological properties appear between the host superconductor and the new superconductor.

By virtue of the principle of correspondence between the volume and the edge of the superconductor (bulk-boundary correspondence principle), special states appear at the edge, so called Majorana states, which have very exotic and purely quantum properties.

The candidate should have a strong background on a broad set of skills for theoretical and experimental solid state research, especially on Quantum Science and Technology.

Interested candidates should submit an updated CV and a brief statement of interest to the application email listed above. Reference letters are welcome but not indispensable. The reference of the specific opening to which the candidate is applying should also be stated in the subject line.