



CALL FOR APPLICATIONS - October 2022

Post-doctoral Position

Donostia International Physics Center (DIPC) is currently accepting applications for Post-doctoral positions. This is a unique opportunity for junior researchers with a recent PhD degree 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.

Openings with a duration of more than one year are for a 1-year contract, renewable based on performance and availability of funding.

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 (40%)
- Adequacy of the candidate's scientific background to the project (40%)
- 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. 2022/62
Multiscale modelling of moiré materials

Supervisor(s):

Fernando de Juan (fernando.dejuan@dipc.org)

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Duration*: 1 year

Application Deadline: 21/10/2022

Application Email: jobs.research@dipc.org

The goal of the project is to build theoretical models to describe the rich phenomenology observed in moiré-patterned Van der Waals materials, including (but not restricted to) twisted bilayer graphene. Our approach will be holistic albeit based on two fundamental aspects of these systems:

- 1) Their dual character (of soft-hard matter) associated with the lack of translational invariance and the existence of soft phonons (or phasons), which may be responsible for anomalous transport and thermodynamic properties observed at low temperatures as well as for playing a role in the onset of superconductivity.
- 2) The sensitivity of the single-electron spectrum as well as of the electron correlated phases to various ambient conditions (substrate, tensions, twist-angle disorder, etc). In that regard, non-linear responses are instrumental to discriminate against different forms of symmetry breaking. We will focus on photogalvanic effects, second-harmonic generation and different forms of optical activity, and how they are affected by often neglected couplings such as the ones induced by lattice commensuration or by the spin-orbit interaction. We aim to develop new calculation schemes to evaluate these effects and establish a connection between these observables and the electronic phases of moiré materials, discriminating between theoretical models in the process.

Interested candidates should submit an updated CV, a research statement and two recommendation letters. The reference of the specific opening to which the candidate is applying should also be stated in the subject line.

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