Donostia International Physics Center

DIPC POST-DOCTORAL POSITIONS

The Donostia International Physics Center DIPC is currently accepting applications for post-doctoral appointments. This is a unique opportunity for highly motivated junior researchers with a recent PhD degree in physics or related fields to join some of the DIPC high-profile research teams.

Interested candidates please send an updated CV, a brief statement of interest, and contact information to postdoc@dipc.org. Reference letters are welcome but not indispensable. The particular position(s) to which the candidate is applying should be stated as well. Although candidates are encouraged 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 mentioned above (postdoc@dipc.org).

Next review of applications is scheduled for December 11th 2015. Applications must be received before this date and will be evaluated by a Committee designed by the DIPC board on the basis of the following criteria (with point weights indicated in parentheses):

- CV of the candidate (40%)
- Adequacy of the candidate's scientific background to the project (40%)
- Reference letters (10%)
- Others: 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 duration of the appointment will be 1 year. The appointment could be renewed for a second year, subject to performance and to the availability of funding.

The salary will be 32000 euros per year before taxes.

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JOB OPENINGS

- ***Time-Dependent Density-Functional Theory beyond the Local-Density Approximation***

  Contact person: J.M. Pitarke (jm.pitarke@ehu.eus). Reference: 2015/7.

  Time-Dependent Density Functional Theory (TDDFT) is heavily used nowadays for the investigation of ground-state properties (by using the fluctuation-dissipation theorem) and optical properties of many-electron systems. Nevertheless, many of the existing implementations rely on the use of an adiabatic local-density approximation (LDA).

  The goal of this project is to go beyond the LDA by constructing fully non-local exchange-correlation (xc) kernels that should allow for the description of many-electron systems of practical interest, such as organic conjugated polymers, strongly-correlated materials, and quasi two dimensional systems.

- **Development of transport methods based on Wannier functions**

  Contact person: N. Lorente (nicolas_lorente001@ehu.eus). Reference: 2015/9.

  This is a project devoted to the development of a computational tool based on density functional theory (DFT) electronic structure expressed on a Wannier basis set. Due to the orthogonality and locality of the Wannier basis set, a tight-binding like Hamiltonian can be obtained to reproduce a region of the electronic spectra interesting for a given physical problem. In the present case we will explore electronic transport under certain physical problems. These problems are related to spin-flip correlations (Kondo effect), to inelastic effects (excitation of vibrations, spin-flip and/or electronic states), to Andreev reflection and Shiba states, and to the presence of strong spin-orbit coupling in transport. The project aims at developing a computational platform based on model Hamiltonians that can be related to realistic situation via a previous DFT calculation.

- **Quantum and classical approaches to the optical response of metallic nanostructures**

  Contact person: J. Aizpurua (aizpurua@ehu.eus). Reference: 2015/12.

  A position is offered to develop a study of the optical response of nanoscale metallic systems with use of classical and quantum mechanical approaches. This project aims to explore the effects of charging in metallic nanostructures as a tool to modify the plasmonic response of nanoclusters. The project will be developed in the framework of a collaboration with the National Institute of Standards and Technology (NIST) of the US to explore quantum descriptions of light-matter interactions.

  The candidate is expected to have good control of techniques to solve Maxwell's equations and obtain the classical response of nanomaterials, as well as experience in the use of Time-Dependent Density Functional Theory (TDDFT) to tackle the quantum approach to the response of these metallic systems. Collaboration with our colleagues from Orsay, in Paris, will also be key to develop the TDDFT studies.