

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 June 30th 2016. 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.

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.

- **Computational Solid State Spectroscopy**

Contact person: E. Krasovskii (eugene.krasovskii@ehu.eus). Reference: 2016/2.

We seek a post-doc with a background in computational or theoretical solid state physics to work in the general area of solid state spectroscopy. The successful candidate will be involved in one or more of the following projects:

1) Development of an efficient computational method for the response function of realistic crystals including surfaces. We are interested in one-particle and collective electronic excitations (plasmons) at the surface layer for novel layered materials, especially in materials with strong spin-orbit coupling, e.g. topological insulators. An important application is the inclusion of the total electric field at the surface into the perturbation operator of the photoemission theory.

2) Development of an ab initio method for angle and spin-resolved photoemission at low photon energies, taking into account a realistic electric field distribution at the surface. The realization will be based on the existing augmented-plane-wave method and computer code for electron scattering by surfaces.

3) Transient phenomena in photoemission: Development of a consistent theory of time-resolved attosecond photoemission from solids. The aim is to establish a relation between the electronic structure of the crystal and the streaked photoelectron spectra and construct a computational method to simulate the electron dynamics in a time-dependent electric field.

- ***Functional materials synthesized by surface-supported chemistry under vacuum***

Contact person: D.G. de Oteyza (d_g_oteyza@ehu.es). Reference: 2016/4.

We are looking for one postdoc to work on the synthesis and characterization of functional materials synthesized on surfaces under ultra-high vacuum. Starting from appropriate molecular precursors, their deposition and subsequent reaction will be characterized at the single molecule level by low-temperature scanning probe microscopy and spectroscopy. Further insight will be obtained from complementary ensemble measurements like electron spectroscopies (photoemission or X-ray absorption) performed with laboratory and synchrotron light sources.

The final products include graphene nanoribbons, donor-acceptor networks and porous organic frameworks. However, along the way the idea is to contribute to the development of the currently still scarcely equipped on-surface chemistry toolbox by identifying new chemical reactions, substrates, optimized reaction conditions and their combination strategies.

Candidates should be motivated researchers with good communication skills and English knowledge. Experience in related topics (scanning probe microscopy, electron spectroscopies, ultra-high vacuum, low-temperature, surface science, self-assembly, surface-supported synthesis, etc) is welcome and will be valued, but not a requisite.

Financial support for this postdoctoral position will be provided through an employment contract with the DIPC for a period of 2 years, associated with the European grant ERC-STG-635919-SURFINK.

- ***Molecular dynamics of membrane structure***

Contact person: X. López (xabier.lopez@ehu.es) Reference: 2016/5.

Molecular dynamics (MD) simulations are widely used nowadays for the structural prediction of biomolecules. The goal of this project is to use MD simulations in conjunction with coarse-grained models to determine the structure and dynamics of biological membranes. The theoretical predictions will be compared with positron annihilation experiments. Besides, we will determine the effect that the introduction of various organic molecules (e.g. cholesterol, etc.) has on the membrane structure.

- ***Optical response of nano antennas and novel materials***

Contact person: N. Zabala (nerea.zabala@ehu.eus) Reference: 2016/7.

We are looking for a post-doc with expertise in theoretical and computational electrodynamics to address the optical response of plasmonic nano-antennas and nano structures of novel materials of technological interest, and their mutual interaction.

A background on plasmonics, solid state physics and multiphysics simulations is also required.

We plan to treat, among others, dielectric arrays of particles, magneto-optical materials, conductive oxides, or ferroelectric materials.

The main goal of this project is to describe surface plasmon propagation in different nanostructure designs containing metallic, ferroelectric and magnetic materials. For this purpose, a great expertise on FDTD (Finite-Difference Time-Domain) is required.