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 February 15th 2010. 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 contract will be 1 year with the possibility of a 2 year extension contingent upon performance.

The salary will be 32000 euros per year before taxes.

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JOB OPENINGS

- ***Theoretical studies of electronic transport in nanostructures***

Post-doctoral position, contact person: Sebastián Bergeret (sebastian_bergeret@ehu.es). Reference:2010/1.

The candidate will study transport and equilibrium properties of hybrid structures consisting of superconducting (S), normal (N) and ferromagnetic (F) metals. Possible research lines are: 1) study of the triplet component in S/F junctions; 2) electron cooling in S/N nanostructures; 3) non-local transport in superconductors; 4) effect of microwave fields on the transport through superconducting nanostructures. The candidate should have a good background in quantum field theory and superconductivity.

- ***Magnetoelectric couplings and related optical responses***

Post-doctoral position, contact person: Ivo Souza (ivo_souza@ehu.es). Reference: 2010/4.

The target area for this position is the theory of magnetoelectric couplings in solids. Possible topics include: (1) the orbital magnetization response to a static electric field; (2) magnetoelectric effects in the optical range, as well as the closely-related phenomenom of optical activity in non-magnetic solids. Experience with first-principles density-functional methods is essential. The position will be available starting in January of 2011, with a preferred starting date within the first half of the year.

- ***Computational solid state spectroscopy***

Post-doctoral position, contact person: Eugene Krasovskii (eugene_krasovskii@ehu.es). Reference: 2010/2.

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

1) 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 model to simulate the electron dynamics in a time-dependent electric field.

2) Development of an efficient ab initio method for angle and spin-resolved photoemission at low photon energies. The aim is to extend the recently developed augmented-plane-wave based method for electron scattering by surfaces to the case of strong spin-orbit coupling for the application to novel materials, in particular, topological insulators.

3) Development of a computational method for the response function of realistic crystals including surfaces. The aim is to accurately calculate electronic excitations at the surface, in particular plasmons, for a wide range of materials. An important application is the inclusion of the total electric field at the surface into the perturbation operator of the photoemission theory. The method will be further extended to the calculation of the tensor response function for the construction of the exchange-correlation kernel of time-dependent density functional theory.

- ***Electronic excitations and many-body effects in solids, surfaces, and nanostructures***

Post-doctoral position, contact person: J.M. Pitarke (jm.pitarke@ehu.es). Reference: 2010/7.

The aim is to carry out model and first-principles theoretical investigations of electronic excitations and many-body effects in solids, surfaces, and nanostructures, in the framework of Density-Functional Theory (DFT), Time-Dependent DFT, Green functions, and Quantum Monte Carlo.

- ***Gaussian basis sets for FCI calculations on harmonium atoms and molecules***

Post-doctoral position, contact person: Xabier López (xabier.lopez@ehu.es). Reference: 2010/8.

The successful applicant will work on interacting multielectron systems confined by either harmonic or gaussian one-electron potentials. Calculations of the electronic structure of these systems both for the ground and excited states are aimed to be carried out at the highest level possible. Full configuration interaction or similar methods will be preferred. The basis set functions will be correlation-consistent gaussian-type, and contraction schemes for their optimum usage will be assessed in depth. The successful applicant will be responsible of implementing such developments in general purpose electronic structure programs. Consequently, experience with quantum chemistry methods and software is required. Additionally, previous exposure to the techniques of generating basis function sets will be highly regarded.

- ***Atomistic Molecular Dynamics Simulations of Polymers under confinement***

Post-doctoral position, contact person: Juan Colmenero (juan.colmenero@ehu.es). Reference: 2010/9.

The objective of this work is to do simulations at atomistic level of polymers under hard nano- confinement. The results obtained will be validated by means of microscopic techniques, mainly quasielastic and inelastic neutron scattering. The final goal is to investigate the changes in structure and dynamics of polymer under confinement. In particular, we are interested in polyethylene oxide (PEO) extremely confined by graphite oxide GO layers. Under these conditions we are expecting planar configurations (i.e., two dimensions) of the chains. We also plan to investigate the type and role of strong local interactions between PEO and GO. Background of the candidates in atomistic MD methods and polymer physics will be evaluated.