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 October 1st 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 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.

- ***Ab-initio calculation of dielectric response at the surface***

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

The candidate will develop a computational method and computer code to calculate the full dielectric function of crystals with surfaces. The method will be based on the augmented plane wave formalism of the band structure theory. The aim is to be able to describe electronic excitations at the surface for a wide range of materials, in the first place noble metals and transition metal compounds. The expected outcome of this project will be the calculation of the response of the crystal to incident light in order to include the total electric field at the surface into the perturbation operator of the photoemission theory.

- ***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.

- ***Ab initio study of the structural, electronic and optical properties of nanoparticle-filled molecular cages***

Post-doctoral position, contact person: Daniel Sánchez-Portal and Javier Aizpurua (sqbsapod@ehu.es). Reference: 2010/5.

We aim to describe using first-principles electronic-structure methods the electronic, structural and optical properties of metal and semiconductor nanoparticles inside rigid molecular cages called cucurbiturils (CB). The purpose is to assemble them into functional nano-chains. This type of nanocage structures might enable the robust construction of effective optical antennae at visible wavelengths, room-temperature single-electron-tunnelling transistors and combined photovoltaics. Such functional properties open up novel alternative methods for directed assembly using irradiation with precisely-tuned lasers, nano-electrochemistry or ac-electric fields.

All these possibilities rely strongly on the actual electronic properties of the cucurbiturils. Therefore a full and complete first principles characterization of these systems is crucial for the success of the project. This study will be developed in close collaboration with experimental groups in several European universities and is partially supported by the European Union.

Concrete objectives of the project are: a) CB structure and electronic properties, b) CB filling, c) CB chain formation for plasmonic rod formation and single electron transport in the chain.

We are looking for highly motivated individuals with a PhD in computational physics, theoretical chemistry or material science. Experience with density-functional electronic-structure calculations is essential. In particular, we plan to use the SIESTA code for most our calculations, therefore, experience in the use of this methodology is highly desirable.

- ***Investigation of phonons in heavy materials***

Post-doctoral position, contact person: Eugene Chulkov (waptctce@sq.ehu.es). Reference: 2010/6.

Well experienced candidates in the field of calculations of bulk and surface phonons and electron-phonon interaction within the DFT perturbation theory are encouraged to submit her/his curriculum to Prof. E. V. Chulkov. The subject of the future investigations is surface and bulk phonons and electron-phonon interactions using relativistic DFT perturbation theory code in a wide spectrum of heavy materials including Bi and Pb.