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 9th 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

- ***Topological Defects on Carbon-like Nanostructures***

  Contact person: A. Ayuela (swxayfea@sw.ehu.es). Reference: 2015/4.

  We are currently looking for a Postdoctoral Fellow in the field of condensed matter physics to carry research on novel carbon-like materials and nanostructures. This work would probably require the collaboration with other theoretical groups from Spain and other European countries.

  Candidates will be expected to have:
  - experience in single and bilayer graphene based systems, such as nanoribbons, flakes, nanotubes and heterostructures, mostly including topological defects;
  - experience in tight binding and Green function matching techniques;
  - experience in calculating and analyzing transport and electronic structure properties.

  Some basic understanding of combining tight binding with first principles DFT calculations would be also highly valuable.

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- ***Quantum Matter and Quantum Simulations at the Interface of Optics and Solid-state Physics***

  Contact person: G. Giedke (geza.giedke@dipc.org). *Reference: 2015/5.*

  Quantum Simulations offer a new approach to gain insight in the quantum properties of matter. Taking advantage of highly controlled quantum systems and letting them evolve according to designed interactions and dynamics enabling the efficient study of the physics of strongly correlated quantum systems beyond the possibilities afforded by classical computers. The neutral atoms used in optical-lattice setups for quantum simulators are generally weakly interacting and have separations on the order of optical wavelengths, limiting their capabilities. We aim to overcome these limitations exploring two directions, namely the use of polar molecules (to achieve stronger interactions) and traps close to and incorporating solid-state structures to propose deeper and more closely spaced traps.

  We are looking for an experienced postdoctoral researcher with strong expertise in quantum simulation and a background in quantum optics and quantum many-body physics and interest in the interface to solid-state physics and quantum information science.

  You would join a small newly established group with research interest in quantum information, quantum optics and quantum simulation. The group is part of a diverse, internationally oriented research institute with broad expertise in quantum physics of solids and surfaces.

  Fluency in both spoken and written English is necessary.

- ***Local dielectric spectroscopy by AFM. Application to polymer based materials***

  Contact person: A. Alegria (angel.alegria@ehu.eus). Reference: 2015/6.

  During recent years we developed an Atomic Force Microscope (AFM) based dielectric spectroscopy method to investigated dielectric relaxation phenomena in micro/nano-structured materials with a nanometer spatial resolution. This is based on detecting the phase lag between a locally applied electric field (using an AFM probe) and the resulting displacement current, which originates dissipative electrical processes in the material under investigation. This experimental approach opens a two-fold opportunity. On one hand, fundamental problems related to the molecular dynamics of nano/micro segregated polymer based systems can be readily investigated. On the other hand, by this experimental method one can gain access to technological information relevant for a wide range of applications: materials for energy storage, composite materials, biomaterials, among others.

  Taking all this into account, we are looking for a highly motivated candidate with a good background in polymer based materials, relaxation methods and experience in using AFM. The main tasks to be developed during the project are exploring the feasibility and limitations of using this new experimental approach for both fundamental understanding in polymer physics and the material properties relevant for technological applications.

- ***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.