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 1st 2014. 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

- ***Vibrational properties of bulk materials and nanostructures***

  Contact person: T. Frederiksen (thomas_frederiksen@ehu.es). Reference: 2014/14.

  The goal of the research project is to characterize vibrational properties of bulk and nanostructured materials using first-principles calculations in order to study their thermodynamic and transport properties. The work will particularly focus on systems where the standard harmonic approximation breaks down and anharmonicity determines the vibrational properties. Methodological developments to properly include anharmonic effects in the calculations will be pursued. Solids close to dynamical instabilities like charge-density wave systems, ferroelectrics or thermoelectrics will be studied, considering the importance of anharmonic effects in those cases. Thermal transport in nanostructures will also be studied in the project.

  The candidate is expected to have:

  - a solid background in first-principles calculations
  - experience in the calculation of anharmonic vibrational properties
  - coding abilities in Fortran and Python
  - high scientific curiosity towards new research topics

- ***Domain-averaged Molecular Fermi Holes and Quantum Molecular Aromaticity***

  Contact person: X. Lopez (xabier.lopez@ehu.es). Reference: 2014/15.

  The successful candidate must have a strong background in theoretical chemistry. Particular attention will be paid to proven experience in the characterization of quantum topological domains within the quantum theory of atoms in molecules methodology, along with familiarity with domain-averaged Fermi holes and complementary chemical bonding analyses.

  The successful candidate will be responsible for the development of computational code related to DFT and DMFT in both time-independent and time-dependent frameworks for the characterization of the above mentioned molecular quantum domains. He will also be responsible of carrying out calculations of electronic energies, nonlinear optical properties and molecular excitation energies using these methodologies.

- ***Computational Plasmonics***

Contact person: A. Kazansky (kazan356@rambler.ru). Reference: 2014/16.

The DIPC invites applications for a postdoctoral position aimed to reinforce its activity in the domains of nanoplasmonics. The postdoc will carry out the research in the field of theoretical modelling of plasmonic nanostructures.

Nanoplasmonics is a rapidly emerging field that attracts a great interest raised by its potential to be used in many important applications such as molecular sensors and spectroscopy, plasmonic assisted chemistry, miniaturized photonic circuits and ultrafast communications, thermo- and photovoltaics, light-emitter diodes. Nanoparticles of noble metals sustain local plasmon resonances that concentrate the near-field at the nanoscale and are tunable via engineering of the nanoparticle(s) geometry and composition. The plasmonic properties of metallic particles and their arrangements are widely studied within classical approaches that become inadequate once a plasmonic nanostructure interacts with inherently quantum source. For example, for the plasmon assisted Forster resonance energy transfer, molecule florescence, as well as spontaneous emission of colloidal quantum dots a description of a quantum emitter near a metal surface as a mere classical dipole is inadequate.

The postdoc will work on the development of the mixed quantum/classical theoretical treatments to be used in the description allowing to correctly treat the eventual complexity of the quantum system along with plasmonic response of the nanoparticle it is coupled with. The postdoc will be expected to develop close working relations with scientists and technologists located in San Sebastian. The international cooperation with leading scientific institutions is envisaged for this project as well. The potential applicant will be expected to have a relevant PhD degree and demonstrable productivity, scientific creativity and an exceptional technical knowledge of computational plasmonics. The position is available starting from January 1st. Further information can be obtained from Prof. Andrey Kazansky by mail (kazan356@rambler.ru).

- ***Spin dynamics of atomic objects on surfaces***

  Contact person: A. Arnau (andres.arnau@ehu.es). Reference: 2014/17.

  The successful candidate must be an expert in single-atom studies of magnetism on surfaces to make the link between theory and STM experimental groups. It is mandatory to have a deep knowledge of low-temperature STM with vectorial magnetic fields as well as working concepts of magnetism at the atomic scale. The project deals with the characterization of magnetic dynamical properties of man-made magnetic structures via atomic manipulation on semiconducting, metallic and superconducting surfaces. Experience analysing and simulating magnetic excitations and Kondo spectra is then important. A joint collaboration among several groups of the San Sebastian area is envisaged, and for that the candidate must have excellent skills to bridge the gap between experimenters and theoreticians.