CIC nanoGUNE
nanoscience cooperative research center

SUMMER INTERNSHIPS 2017

TITLE: Electron transport in hybrid graphene devices

DESCRIPTION (Objectives, tasks, materials, equipment,…): The recent discovery of graphene opened a full field of research on two-dimensional materials. In these materials, electrons behave differently to electrons in typical bulk materials. For example, electrons in graphene move as massless particles, but still possessing electronic charge and magnetic moment (spin). The manipulation of these electrons by external magnetic or electric fields offers a plethora of different exotic states of matter, such as the Quantum Spin Hall effect, which is predicted to be at the core of future quantum spintronic devices.
A possible strategy to manipulate electrons in graphene is to bring it to the proximity of a material with the required magnetic/electric fields, for example an insulating ferromagnet. The electrons in the combined graphene-ferromagnet system will behave differently, following the physics of the Quantum Spin Hall effect at very low temperatures. The purpose of this project is to construct a hybrid graphene/ferromagnet device using the in-house facilities and to measure the electrical behavior at very low temperatures with the purpose of determining the novel transport mechanisms.

SUPERVISOR: Reyes Calvo & Nacho Pascual

SHORT DESCRIPTION OF THE GROUP: The research group nanoimaging is expert in low temperature probe microscopies. Their research focuses on the study, and manipulation of materials at the atomic and molecular scale. The group combines atomically resolved microscopy and spectroscopy with a wide variety of synthesis, growth and characterization techniques within the local environment of nanoGUNE.

TIMETABLE: 9:00-13:00, 15:00-17:00

COMMENTS: : Internship duration from 1.5 to 2 months (to be discussed).
Applicants should send an email to jm.pitarke@nanogune.eu including their academic record.
More info: http://www.nanogune.eu/summer-internship
Deadline for applications: 5 February 2017

SUITABLE FOR: Physicists, Engineers