

SUMMER INTERNSHIPS 2017

TITLE: Spin-to-charge current conversion in interface

DESCRIPTION (Objectives, tasks, materials, equipment,...):

Spintronics is a rapidly growing research area that aims at using and manipulating not only the charge, but also the spin of the electron, with potential application to information technology. Pure spin currents, in which spin angular momentum with no electric charge is transported, are essential to achieve this goal. One of the most promising methods to create pure spin currents is the spin Hall effect which, in presence of spin-orbit coupling, generates a spin current transverse to the charge current in a bulk material. More efficient spin-to-charge current conversions have been observed in interfaces with Rashba coupling, through the so-called Rashba-Edelstein effect.

Within this framework, we want to study novel interfaces that maximize the Rashba-Edelstein effect. We expect that combinations of a light metals and a heavy metal in a bilayer will show very large spin-to-charge current conversions.

In this project, the student will do some basic use of high vacuum sputtering system to grow metallic bilayers of light metals (Co, Ni, Al, Cu) and heavy metals (Pt, W, Ta). Devices in the form of Hall bars will then be fabricated and characterized with anomalous Hall measurements (related to the spin-to-charge current conversions). The student will learn how to measure magnetotransport properties by using a cryogenic system (which can lower the temperature down to 2 K) with high magnetic fields (up to 9 T) that works with liquid helium.

SUPERVISOR: Ikerbasque Prof. Dr. Felix Casanova, CIC nanoGUNE,

TIMETABLE: to be determined

COMMENTS: nternship duration 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