PRE-DOCTORAL RESEARCHER ON 2D VAN DER WAALS MAGNETIC HETEROSTRUCTURES (SPEAR)

Company Description

NanoGUNE is a Research Center devoted to conducting world-class nanoscience research for a competitive growth of the Basque Country. NanoGUNE is a member of the Basque Research and Technology Alliance (BRTA) and is recognized by the Spanish Research Agency as a María de Maeztu Unit of Excellence. The Nanoscience Cooperative Research Center, CIC nanoGUNE, located in Donostia - San Sebastian, Basque Country (Spain),

Information

Deadline: 2021-05-31
Category: Academia
Province: Gipuzkoa
Country: Basque Country
City: Donostia, Guipúzkoa (ES)

Company

CIC nanoGUNE

Main functions, requisites & benefits

Main functions

The Nanodevices group, co-led by Prof. Luis E. Hueso and Prof. Fèlix Casanova, is currently composed of 20 members including senior and junior researchers. The group counts with extensive research facilities for fabrication and characterization of devices and several active research lines spanning from nanofabrication to 2D electronics and spin transport. More information can be found at http://nanodevices.nanogune.eu Supervisor: Prof. Luis Hueso. Description: The magnetic response of ultra-thin materials been explored for decades. However, very recently and thanks to the surge of exfoliable magnetic crystals, a new interest has arisen for the investigation of magnetic phenomena in the true 2D limit [1-3]. In this project, the successful candidate will explore vertical 2D heterostructures are a possible way of creating artificial novel magnetic states. Building from the previous experience in the group in graphene-based heterostructures, here we will profit again from the clean interactions that the nominal lack of defects provides, thus avoiding, for instance, pinning sites that obscure the intrinsic response of the materials [4-6]. Diverse materials with ferromagnetic and antiferromagnetic order will be combined. In the first instance, and using magnetic frustration as a base, we will fabricate synthetic antiferromagnetic materials. Subsequently, the candidate will explore magnetic twistronic devices. We will consider the special properties of vdW heterostructures in comparison with conventional covalent or ionic crystals, as this vdW materials provide an opportunity for performing experiments in which the angle between different layers is changed by mechanical rotation. The research will require the exfoliation and stacking of 2D materials into van der Waals heterostructures, the nanofabrication of devices (thin film deposition, electron beam lithography, etching), and magnetic and magnetotransport measurements (high magnetic fields and low temperatures). [1] B. Huang et al., Nature 546, 270 (2017). [2] C. Gong and X. Zhang, Science 363, eaav4450 (2019). [3] D. R. Klein et al., Science 360, 1218 (2018). [4] C.K. Safeer et al., Nano Lett. 19, 1074 (2019). [5] C.K. Safeer et al., Nano Lett. 19, 8758 (2019) [6] C.K. Safeer et al., Nano Lett. 20, 4573 (2020). The position is expected to start betwen May and September 2021 and go on for a total of 3 years in the Nanodevices group. The contract will be funded by the European Union's Horizon 2020 research and innovation programme under the Marie Sklodowska-Curie grant agreement No. 95567.

Requisites

The successful candidate will have: Master's degree in Physics or a similar field. Good verbal and written communication skills in English. Although not compulsory, the following points will be considered: Previous knowledge of spintronics. Experience in the following techniques: thin film growth, nanofabrication, exfoliation of 2D materials, magnetotrasport. Self-motivation and willingness to perform independent research.

Benefits

An international and competitive environment, state-of-the-art equipment, and the possibility to perform research at the highest level. A teamwork in a diverse and inclusive environment and welcome all kinds of applicants regardless of age, disability, gender,