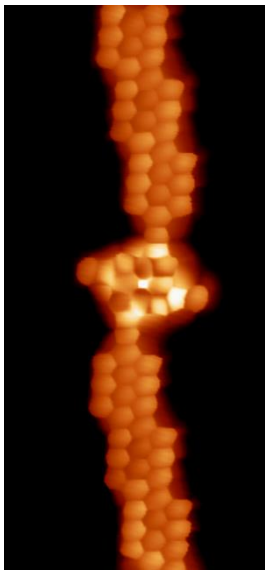
PhD position available at CIC nanoGUNE, San Sebastián, on

Magnetism in atomically precise graphene nanostructures

We are seeking for candidates to fill a PhD position in experimental physics, in the fields of molecular physics and condensed matter.

There is consensus that spins will expand our current Information Technology landscape, based in charges – i.e. nanoelectronics, into a class of faster and more power efficient components, being also a basic element in the second quantum revolution as qubit elements for quantum computation. Optimal materials are required that combine well-defined spin localization and coherence, with electrical addressability, and precise integration into mesoscopic architectures and scalability. A promising material combining these properties is graphene. Graphene is a diamagnetic material but shaped in specific forms, it can host localized spins.



The successful candidate will fabricate custom-crafted graphene nanostructures on surfaces and investigate the emergence of magnetic states using low-temperature scanning tunneling microscopy. The goal is to demonstrate their potential as elementary active components for quantum spintronics devices.

To fabricate graphene flakes with atomic-scale precision a novel method called "on-surface synthesis" will be used. This technique utilizes an organic molecule with a pre-defined shape and active sites as a precursor (building block) and uses temperature and a metallic surface to catalyze and steer the bottom-up covalent assembly into larger structures. The attached figure illustrates the potential of this method to fabricate, for example, a magnetic molecule connected to two graphene stripes. The research project involves demonstrating the optimal structure and magnetic properties using scanning tunneling microscopy at low temperatures. As a reference, recent publications from our group related to this field are: Science Advance 4, eaaq0582 (2018), Nat. Comm. 10, 200 (2018), and Nano Letters 19, 3288 (2019).

The successful candidate will form part of a research group studying fundamental quantum mechanisms of surface/atom/molecule science. The group combines various methods of probe microscopy and spectroscopy with a wide variety of synthesis, growth and characterization techniques. The research will be performed under the supervision of Prof. Nacho Pascual. More information about our research group can be found in www.nanogune.eu/nanoimaging

San Sebastian is a middle size city lying directly at the Atlantic seacoast and surrounded by a sensational environment of hills and mountains full of tradition and nature. The city is close to the French border, showing a dynamical cultural scene and renowned for its Basque cuisine.

The ideal candidate should have a Master in Physics or related fields, with a background and interest in molecular science and solid state phenomena, proficiency in English and communication skills, good hands on experimental work, and cooperative attitude to teamwork. **For application** please fill the form in https://www.nanogune.eu/nanoimaging/join-us and submit an updated CV and a letter of interest, including contact information to two reference scientists.

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