

## 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.

## Information

 **Deadline:** 2023-03-31  
 **Category:** Academia  
 **Province:** Gipuzkoa

 **Country:** Basque Country  
 **City:** Donostia / San Sebastián

## Company

CIC nanoGUNE



## Main functions, requisites & benefits

### Main functions

The Nanomagnetism group at the CIC nanoGUNE, the nanoscience research centre in San Sebastián, Spain is seeking to recruit talented, enthusiastic young scientists who are highly motivated to boost their research career in the area of nanoscience and quantum technologies. The successful candidate will be part of a project carried out in our group in the framework of a collaborative project with the BCMaterials, Basque Center for Materials, Applications and Nanostructures and the University of the Basque Country (UPV/EHU) through a funding provided via the IKUR strategic program promoted by the Education Department of the Basque Government to boost Scientific Research. Motivation Over the last decade, a novel class of magnetic metamaterials appeared related as artificial analogues to spin-ice materials, rare-earth titanate materials where the frustration between magnetic moments leads to a playground of fundamental physics studies. These novel materials, dubbed artificial spin ices (ASIs), made of interacting elongated nanomagnets, have emerged as a fertile ground for the study and discovery of novel phenomena not present in natural magnetic materials, bound to a strong inspiration for potential applications. The field of ASIs is currently reaching levels of maturity that bring the state-of-the-art to a position where different pathways emerge as natural alleys for the field to evolve into. In particular, pushing the limits of the nanofabrication skills of the ASIs will eventually allow these systems to be used as playgrounds to prove quantum effects, being this ground-breaking approach the issue of study of the present project. In more detail, we plan to exploit methods in which a classical ASI ground state manifold can serve as a rich playground to explore quantum lattice gauge theories. Subsequently, we will be able to stimulate string physics "on a chip", using the ASIs as playgrounds to study the propagation of open-loop and closed-loop quantum excitations (monopoles). This task will allow us to get ready for the engineering of ASIs as platforms where deterministic quantum effects can be experimentally explored. For more information about the position, please contact the Nanomagnetism Group Co-leader, Paolo Vavassori. The deadline for applications is 31/03/2023.

### Requisites

Required qualifications – Eligibility To apply for a PhD fellowship, candidates must hold an internationally recognized Master-equivalent degree in physics, nanoscience, or engineering. Previous experience in magnetism at the nanoscale, thin films deposition, and e-beam lithography would be positively evaluated. No restrictions of citizenship apply to the PhD fellowship. Candidates should apply by completing the form below and attaching the following documents: A complete CV A presentation letter with declaration of interests and a description of your past achievements (max. 1 page) Contact email of 1/2 potential references A scanned copy of your university academic transcripts in English A scanned copy of the Master degree, if available at the time of application A scanned copy of standardized English test results if available Application link: <https://www.nanogune.eu/en/nanogune/join-us/open-position/354-pre-doctoral-researcher-quantum-behavior-artificial-spin-ice-lattice>

### Benefits