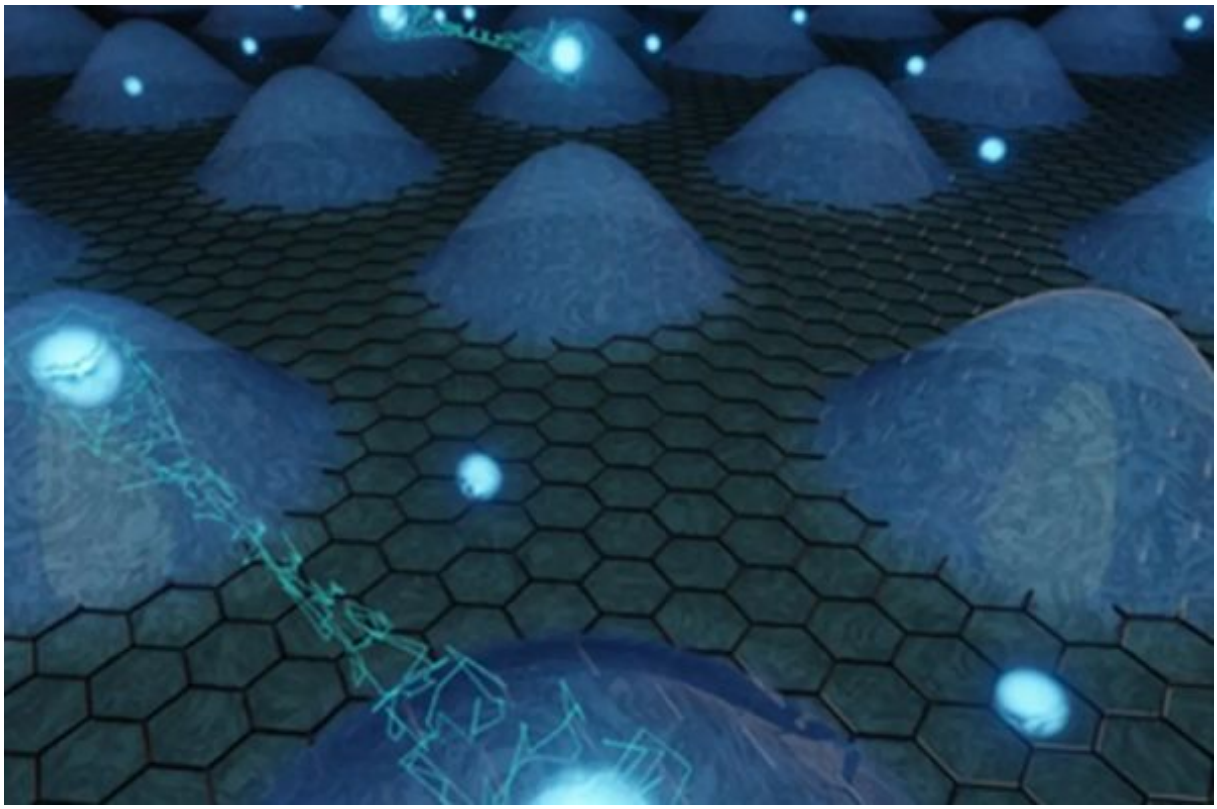


BBVA Fundamentos Grant

ICFO awarded highly competitive funding for EQS project proposal

February 23, 2024

Researchers in ICFO's **QTwist research program** receive one of five highly competitive grants awarded by the BBVA Foundation in their Fundamentos Program. This research progra targets exploratory projects that innovatively address the core or fundamental questions of scientific field or discipline at its current stage of development, or questions of the sam fundamental nature emerging from the intersection of various disciplines. Immediat practical applicability is not part of the spirit of this call. Only five grants were awarded to th over 300 applications across all areas of this call

The Fundamentos Program is open to projects led by up to three principal investigators fro one or more disciplines, and incorporating researchers attached to centers in any country. I this regard, ICFO will carry out a project titled ¡¿½**An Electronic Quantum Simulator**¡¿½ (EQS , led by ICFO professor Adrian Bachtold (coordinator), leader of the Quantum NanoElectronics and NanoMechanics research group, ICREA professor at ICFO Frank Koppens, leader of the Quantum Nano-Optoelectronics research group, and ICFO professor Carmen Rubio Verdu,

leader of the STM on 2D Quantum Materials research group. Other researchers participating in the project include ICFO postdoctoral researchers Dr Ekaterina Khestanova and Dr Giulia Piccinini, and Distinguished Invited Professor at ICFO, Prof Pablo Jarillo Herrero (Massachusetts Institute of Technology), as well as Professor Amir Yacoby (Harvard University).

The QTwist program at ICFO seeks to study the fundamental properties of emerging synthetic quantum materials, including Moire materials, and their potential future applications in nano-electronics. The EQS project, the only one to receive funding in the area of Physics and Chemistry in this Fundamentos call, will specifically seek to develop a cutting-edge quantum simulator based on a graphene superlattice. The experimental tool will be designed to probe the electronic wave function in two-dimensional systems in a completely novel manner. This may become the groundwork for understanding the rich physics emerging from electron correlations in two-dimensional systems.

i¿½We are grateful to the BBVA Foundation for recognizing the potential and importance of the work that we are proposing in the area of correlated electron systems,i¿½ says Pr f Bachtold. i¿½We have a dream team of scientists working on some very relevant fundamental questions. The work is high risk in that we aim to do something that has never been done before, but high potential. If we succeed, we will be able to study by experimental means th Hubbard Hamiltonian in the high-Tc superconductivity regime i¿ ? According to ICFO Director, Lluis Torner, i¿½e new program launched by the Fundacion BBVA is visionary and has to be praised. Over the years, it will support some of the mos innovative fundamental science projects in the country, thus making possible that some o the important global discoveries happen herei¿½