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2D spintronics: harnessing artificial Van der Waals stacks

Van der Waals materials, owing to their atomically thin nature, enable the design of two-dimensional (2D) heterostructures in which proximity effects can be exploited to tailor electronic, magnetic, optical, and spin transport properties, offering a versatile platform for next-generation technological applications. In this talk, I will introduce how we fabricate mesoscopic devices based on 2D materials to study spin transport. I will focus on graphene as a model system and show how its properties can be modified when combined with materials that have strong spin-orbit coupling. In particular, I will explain how crystalline symmetries allow us to control spin-orbit fields in a directional way, and how this control can strongly influence how spins move through the device. The aim of the talk is to provide an intuitive understanding of how combining different 2D materials enables new ways to manipulate spin transport at the nanoscale.

Juan F. Sierra obtained his Bachelor's degree in Physics from the Universidad Complutense de Madrid (2003) and a PhD in Condensed Matter Physics from the Universidad Autónoma de Madrid (2008). After a CNRS postdoctoral fellowship and a Marie Skłodowska-Curie fellowship at CEA/Spintec (Grenoble) between 2009 and 2012, he joined ICN2. There, he held Beatriu de Pinós, Juan de la Cierva, and Ramón y Cajal fellowships before becoming a CSIC tenured scientist at ICN2 in 2023. His main research focuses on charge, thermal and spin-related phenomena in quantum materials, including graphene and topological insulator heterostructures.

Con la colaboración de:



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HORA: 12:30

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