



Departamento de
Física de la
Materia Condensada
Universidad Zaragoza

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“Challenges towards Majorana modes with hybrid superconductor-semiconductor nanowire devices”

Hybrid devices that couple superconductors and semiconductor nanowires have attracted considerable attention owing to their potential to realize topological superconductivity and Majorana zero modes. The topological phase is predicted to result from a combination of induced superconductivity, spin-orbit coupling and spin polarization in the semiconductor nanowire. Crucially, the 1D character of such a system must be preserved over micron-length scales for the topological phase to be established – a requirement that is not so straightforward to meet in realistic materials. In this talk, I will address experiments performed in InAs-based hybrid superconductor-semiconductor nanowire devices, in which charge localization plays an important role. I will discuss different effects associated with the resulting superconductor-quantum dot system, and how their signatures could be mistakenly interpreted in favor of Majorana zero modes. Finally, I will discuss how charge localization strongly impacts the transport properties of quasi-ballistic nanowire quantum point contacts.

Eduardo Lee obtained his PhD in Physics in 2009, having done his thesis work at the Max Planck Institute for Solid State Research in Germany. He then moved to the French Center for Atomic and Alternative Energies in Grenoble for a post-doc stay, which was partly funded by an Intra-European Marie Curie Fellowship. After that, he spent a year at the Institute Neel, also in a Grenoble, before joining the IFIMAC (UAM) in 2016. His main research interests are low temperature transport measurements on nano-devices. In particular, his research is presently directed towards studying hybrid devices which couple superconductors and low-dimensional semiconductors, a promising platform for generating topological superconductivity. He was recently awarded an ERC Starting Grant to develop this project

19 de Marzo (lunes)

Con la colaboración de:



Facultad de Ciencias
Universidad Zaragoza

**LUGAR: SALA DE GRADOS DE LA
FACULTAD DE CIENCIAS**

HORA: 12:30