11 de MAYO de 2023

11.45 h
Aula, Edificio I+D, Campus Río Ebro

INMA Junior

# SUPERCONDUCTING DEVICES BASED ON $Bi_2Se_3$ JUNCTIONS


## Rubén Gracia Abad
## INMA-CSIC/Unizar



Topological insulators are materials with an insulating bulk and metallic surface states protected by time reversal symmetry. In particular, $Bi_2Se_3$ has attracted much attention due to its simplicity and its relatively large band gap. These materials can be combined with superconductors to create hybrid devices presenting unconventional effects not observed in standard superconductor devices. Here, we explore the properties of hybrid superconductor devices combining $Bi_2Se_3$ and type-II superconductor WC fabricated by Focused Ion Beam (FIB)-related techniques. The electrical characterization of these devices shows that the superconductivity is induced in the topological insulator, presenting coherent transport through the $Bi_2Se_3$ junctions, which leads to a large modulation of the superconducting properties with complex features. Further modification of the device by FIB results in the suppression of this behaviour and seems to indicate that it was originated as an interference of two coherent channels, one coming from the bulk and the other one coming from the surface states.


INMA INSTITUTO DE NANOCIENCIA Y MATERIALES DE ARAGÓN

CSIC Consejo Superior de Investigaciones Científicas

Universidad Zaragoza