



MINISTERIO
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ICMAB-CSIC open position

PhD 4-years contract

(contract starting on December 2025)

Financed by Severo Ochoa program:

Materials Transition for Tomorrow's World

(MaTrans42 CEX2023-001263-S)

Research description:

Magnons are the fundamental units of magnetic excitations of the electron's spin in magnetic materials and represent a change of 1 unit of spin angular momentum. When a magnon propagates through a magnetic medium, no electrical charge transport is involved and hence no electrical losses take place. This is one of the key advantages of using magnons as information carriers in devices. We aim to explore engineered heterostructures with unconventional merging of functional materials to develop a new generation of sensors and quantum devices. Devices based on the synergetic combination of oxide ferromagnetic (FM), antiferromagnetic (AFM), Ferrimagnetic, or Superconducting (SC) materials will be investigated. In particular, AFM in spin-orbit-torque architectures will boost density and speed in logic and memory applications, due to its intrinsic insensitivity to spurious magnetic fields and THz dynamics. Merging superconductivity and spintronics opens a rich perspective of new physics with the potential to achieve dissipation-less quantum coherent transport in SC spin-based devices.

Our scope is to study the fundamental physics of these materials with a focus on experimental basic research yet including the perspective on technological relevance. The project combines experimental work, involving preparation and in-depth characterization of complex oxide thin film and heterostructures. Evaluation of the spin-charge current interconversion rates efficiency by DC spin pumping, spin-torque ferromagnetic resonance, and/or second harmonic detection will be performed.

Candidates should contact:

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Advanced Characterization and Nanostructured Materials (ACNM)

(<https://acnm.icmab.es/>)