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“Spintronics in topological insulators and 2D materials: interfacial phenomena”

Spintronics is one of the vast prospects for applications of 2-dimensional (2D) and topological materials with large spin-orbit coupling (SOC). Exploitation of the huge potential in these materials will provide new opportunities of achieving control and manipulation of spin transport in hybrid structures. We have investigated interfacial phenomena in heterostructures with large SOC topological and 2D materials that could be incorporated into spintronic devices. In the first part of my talk, I will describe our recent results in systems combining topological insulators and ferromagnetic materials. In the second part, I will focus on hybrid structures of 2D materials. In both cases, the use of advanced characterization techniques, such as x-ray absorption spectroscopy in synchrotron radiation facilities, and laboratory-based spin-torque ferromagnetic resonance, have provided unparalleled information about magnetic proximity effects and spin phenomena at their interfaces.

Adriana I. Figueroa completed her PhD in Physics in 2012 at the Instituto de Ciencia de Materiales de Aragón- CSIC-Universidad de Zaragoza, under the supervision of Prof. Juan Bartolomé and Prof. Luis Miguel García Vinuesa. During her PhD, she studied systems of magnetic nanoparticles using synchrotron radiation techniques and RF transverse magnetic susceptibility. In 2013, she was appointed as a postdoctoral research associate at the Magnetic Spectroscopy Group led by Prof. Gerrit van der Laan in Diamond Light Source, Didcot, UK. There, her focus was on spin phenomena in topological insulators as well as on advanced synchrotron x-ray absorption spectroscopy techniques (XAS, XMCD) to study the structural and magnetic properties of magnetically-doped topological insulators, magnetic heterostructures, nanoparticles and complex oxides. In 2017, she was awarded a Juan de la Cierva fellowship to join the Physics and Engineering of Nanodevices group of Prof. Sergio O. Valenzuela in the Institut Català de Nanociència i Nanotecnologia (ICN2), Barcelona. In 2019 she was awarded a Marie Skłodowska-Curie individual fellowship. At ICN2, she grows topological insulators thin films by molecular beam epitaxy and complements synchrotron XAS methods with structural (e.g. TEM, XRD) and chemical (e.g. XPS) characterization to explore the electronic, spintronic and magnetic properties of heterostructures incorporating topological insulators and 2D materials.

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4th of March (Thursday)

PLACE: Zoom & Youtube (scancode)

TIME: 12:30

