

Spin currents and spin dynamics in metallic nanostructures*Sergio O. Valenzuela**ICREA and Centre d'Investigació en Nanociència i Nanotecnologia (CSIC-ICN), Bellaterra
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Spintronics aims to replace charge with spin as the main computational element in devices. Much effort is being devoted to understand how the electron spin is transferred through interfaces and to identify fundamental processes that modify the spin polarization or that can be used for spin manipulation. Nonlocal lateral structures are a unique tool to study these phenomena because of the ease to fabricate them in multi-terminal configurations. In the first part of the talk, this will be illustrated by some of our experimental results in thin-film devices, where the output voltage is exclusively determined by the spin degree of freedom and provides valuable information on spin-flip scattering mechanisms, spin-polarized tunnelling, spin-orbit interaction and the spin Hall effect. In the second part of the talk, the transport properties of ferromagnet-superconductor-ferromagnet single electron transistors will be described. Spin injection in the superconducting island is demonstrated by extending the Meservey and Tedrow technique to a double junction. It will be shown that, under proper conditions, the Zeeman split density of states can be used as an efficient spin filter.