STUDY OF SPIN TRANSPORT AND NOVEL QUANTUM STATES IN MULTILAYERS FROM ORGANIC AND OXIDE MATERIALS

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Our group specialises in experimental techniques to grow thin film multilayers and heterostructures that consist of oxides with strongly correlated electrons and of organic materials. Furthermore, we apply dedicated spectroscopic techniques, like infrared ellipsometry, low-energy muon-spin-rotation and neutron reflectometry, to explore their electronic and magnetic properties on the relevant nanometer scale. Of particular interest are novel quantum phenomena that may arise from competing interactions and the spin-transport phenomena in real devices. As examples I will present our results on oxide multilayers that combine cuprate high T_c superconductors (HTSC) and oxide-based ferromagnets like $La_{2/3}Ca_{1/3}MnO_3$ or $SrRuO_3$. I will also show direct measurements of the current-induced spin transport in the buried layers of an operational spin valve device.

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