Magnetic behavior of metastable Fe films grown on Ir(111)

A.Calloni,[1] M.Cozzi,[1] G.Berti,[1] G.Bussetti,[1] M.Finazzi,[1] F.Ciccacci,[1] and L.Duò[1]

[1] *Politecnico di Milano, Milano, p.za Leonardo da Vinci 32 I-20133, Italy*

Fe on fcc Ir is a well known model system for the study of the magnetic behavior of ultra-thin films. At low Fe coverages and applying external stimuli such as electric and magnetic fields, a variety of magnetic configurations, from ferromagnetic to non-collinear, as in the skyrmion lattice, can be stabilized and exploited for applications (such as, for instance, magnetic data storage) [1]. We provide a layer by layer characterization of filled and empty electronic states by means of spin-polarized photoemission and inverse photoemission spectroscopy on ultrathin Fe films magnetized $in-situ$ and analyzed at magnetic remanance. We find a critical thickness of about five monolayers (ML) for the detection of a not nil in-plane polarization signal in the photoemission spectra from Fe. In spite of the apparent complexity of the film evolution, many similarities are found with the growth of Fe on 2 ML Ni/W(110) a prototypical system we have recently investigated by combining photoemission spectroscopy and $ab-initio$ simulations [2].

References:

[1] Hsu et al., Nature Nanotechnology 12 (2017) 123
[2] Calloni et al., Phys Rev. B 94 (2016) 195155