

Centre de Nanosciences et de Nanotechnologies

Séminaire

Jeudi 28 septembre 11 heures Salle D1-132 à 11h, du C2N site Marcoussis

Marie HERVE

" Spin resolved scanning tunneling microscopy: Non-collinear magnetism and high frequency dynamic properties"

Résumé:

In magnetic thin films the Heisenberg exchange interaction often leads to a parallel or antiparallel alignment of neighboring spins in the crystal. When inversion symmetry is broken e.g. by a surface or an interface, the non-collinear Dzyaloshinskii-Moriya interaction competes with the Heisenberg exchange interaction. This competition can lead, in some case, to the stabilization of complex spin textures such as spin spirals or skyrmions. Investigation of the local dynamic properties of magnetic structures - such as skyrmion or nano-skyrmionic lattice - require the implementation of experimental technique with a high spatio-temporal resolution (nm and sub-ns resolution). In this talk, I will first show that spin-polarized STM (SP-STM) is an ideal tool to probe such noncollinear magnetic structure. The characterization of spin spirals and skyrmions state in an ultra-thin Co layer will be presented (fig. 1). In a second part I will explain our current progress in the development of a new experimental technique combining ferromagnetic resonance (FMR) with SP-STM.



Figure 1: (a) Spin polarized differential conductance (dI/dU) map showing a chiral spiral as ground state in a monolayer of Co deposited on a Ru substrate -(b) - (c) - (d) dI/dU maps realized under an out of plane magnetic field of 150 mT revealing the spin structure of a magnetic skyrmion with a magnetic tip spin polarized out of plane (b) and in-plane (c) – In (d) the spin structure was probed employing the tunneling anisotropic magnetoresistance (TAMR) with a non-spin polarized tip.



