



CYCLE DE CONFÉRENCES

Séminaire général du département de physique
de l'École polytechnique

TOWARDS ANTIFERROMAGNETIC SPINTRONICS



par **Jörg Wunderlich**

Senior researcher and group leader
Hitachi Cambridge Laboratory, UK and Institute of Physics,
Academy of Science Prague, Czech Republic

Modern magnetic storage technologies are based on classical spin-transfer magneto resistance and torque effects enabling the detection and manipulation of magnetisation in ferromagnets by spin-polarised currents. A promising new development in spintronics research considers antiferromagnets as active elements for robust magnetic storage and ultrafast information processing.

Although antiferromagnets have been known for about eighty years, their (spin) transport properties have only attracted interest lately. Large magnitude anisotropic magneto-resistance effects in the tunnelling transport regime have indicated the possibility to detect antiferromagnetic order electrically.

Apart from spin transfer torque (STT), also relativistic current induced spin-orbit torque (SOT) effects due to the inverse spin Galvanic effect and/or the Spin Hall effect can be used to manipulate magnetic moments. SOT effects can also act on the magnetic states of antiferromagnets. They have been observed in antiferromagnetic thin films with structural inversion asymmetry and SOT-driven switching of antiferromagnetic states has been very recently realised in CuMnAs, a system with locally broken inversion symmetry of the individual magnetic sublattices.

In my talk I will discuss potentially large magnitude magneto resistance and current induced SOT effects able to detect and to manipulate potentially fast and magnetic field independent the staggered magnetic order of antiferromagnets.

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