LABORATOIRE DE
PHYSIQUE DES SOLIDES
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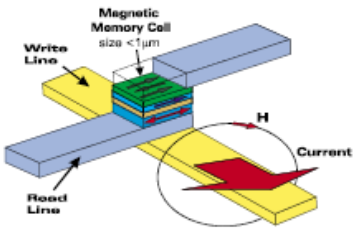
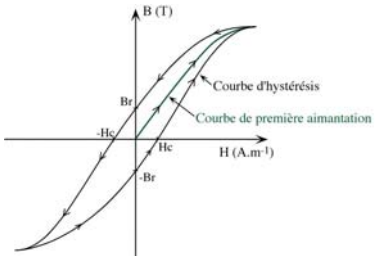
Vendredi 6 Février 2009 à 10 heures 30
(Bâtiment 510 – Petit Amphi)



Séminaire
Magnétisme



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$(Sr,Mn)TiO_3$ - a magnetoelectric multiglass

Multiferroic materials, in which two or more ferroically ordered states exist simultaneously, have become of great interest in recent years because of their potential applications in information storage, spintronics and sensorics. In search for these materials, systems with long range polar and magnetic order are usually considered. Here we extend this frame onto the simultaneous occurrence of two different glassy states, hence, looking for a "multiglass" scenario rather than for a multiferroic one. We study two kinds of generic disorders in $Sr_{0.98}Mn_{0.02}TiO_3$ (SMnT) ceramics prepared by a mixed oxide technology [1], where the Mn^{2+} dopand ions are at the origin of both a polar and a spin glass with glass temperatures, $T_g^e \approx 38$ K and $T_g^m \leq 34$ K, respectively. The freezing of the polar glass triggers that of spin freezing and both glassy systems show individual memory effects. The magnetoelectric (ME) effect was measured using a modified SQUID magnetometer [2]. Even at the dilute concentration of Mn ions (2%), due to strong spin-phonon interaction within the incipient ferroelectric host crystal $SrTiO_3$, we have observed large "paramagnetoelectric" EH^2 and "magnetocapacitive" E^2H^2 ME coupling between both glass systems [3]. We will also discuss magnetic and dielectric data obtained on SMnT ceramics with 3% Mn, which shows, again, multiglass behavior below $T_g \approx 55$ K [4].

References:
1. A. Tkach *et al.*, Appl. Phys. Lett. **86**, 172902 (2005).
2. P. Borisov *et al.*, Rev. Sci. Instr. **78**, 106105 (2007).
3. V. V. Shvartsman *et al.*, Phys. Rev. Lett. **101**, 165704 (2008).
4. S. Bedanta et al., (unpublished).