

POST-DOCTORAL POSITION

Laboratoire des Sciences des Procédés et des Matériaux (LSPM)

UPR3407 CNRS – Université Paris13

Team: Thin films, functional materials and nanostructures (FINANO)

Study of spin waves in thin films submitted to mechanical stresses

The LSPM laboratory is a new CNRS “Centre National de la Recherche Scientifique” unity located on the “Université Paris13” site. This is mainly concerned by elaboration and characterization of materials. In the FINANO team (see website [here](#)), we are interested in dynamic properties of thin films (elastic, magnetic). For many years, our group developed tools (Brillouin Light Scattering (BLS), Ferro-Magnetic Resonance (FMR)) for studying magnetization dynamics in nanomaterials [1,2]. In a new project, called “SpinSress”, financed by the French national research agency (ANR), we develop mechanical tests coupled *in situ* with spin waves analysis. The way proposed here is to study **magnetization in stressed thin films** deposited on (a) compliant or (b) piezo-electric rigid substrates.

(a) In the case of compliant polyimide substrates (used in stretchable micro-electronics), we apply stresses by means of a small micro-tensile tester, which can be incorporated in spectroscopy equipments. The tensile tester is also designed for making *in situ* x-ray diffraction for strain analysis and near field microscopies (Atomic Force Microscopy, Magnetic Force Microscopy).

(b) The possibility to control magnetic properties via electrical fields will be investigated in a piezoelectric actuator/ferromagnetic thin film hybrid structure. In this case, the mechanical stresses to the film will be exerted by the piezoelectric actuator (by applying electric field). Using *in situ* BLS and FMR, the magnetic anisotropy and the magnetization orientation within the plane of the ferromagnetic film will be measured quantitatively.

The post-doctoral position proposed here is concerned with **the two aspects described above**. Candidates must have a PhD in material science or condensed matter physic, good knowledge in magnetic properties. The post-doctoral position is available for 12 months renewable one time and the work can start as soon as possible. The monthly salary is roughly 1800 € (net pay). The deadline for application is March 31, 2011. For further details and application (cover letter and CV) the candidates have to contact:

Damien Faurie (e-mail: faurie@univ-paris13.fr ; Phone: 33 (0)1 49 40 34 84)

[1] A.A.Stashkevitch, P.Djémia, Y.Roussigné, S.M. Chérif, P.R. Evans, A. P. Murphy, W. R. Hendren, R. Atkinson, R.J. Pollard, A.V. Zayats, G. Chaboussant, F. Ott, Physical Review B 80, 144406 (2009)

[2] M. Belmeguenai, F. Zighem, T. Chauveau, D. Faurie, Y. Roussigné, S.M. Chérif, P. Moch, K.Westerholt, P. Monod, Journal of Applied Physics 108, 063926 (2010)