



A PhD grant from the Labex MATISSE at the Institut des NanoSciences de Paris (CNRS – Sorbonne Universités, UPMC Univ Paris 06)

Research project Title:

Thermal hysteresis suppression in giant magnetocaloric effect materials at room temperature

Conventional magnetic materials heat up when they are placed in a magnetic field and cool down when they are removed. This phenomenon is known as the magnetocaloric effect and is the basis of the magnetic refrigeration. The discovery of compounds with a giant magnetocaloric effect (GMCE) at room temperature led to the development of magnetic refrigeration close to ambient temperature conditions. However, their practical application is limited by the fact that the few materials which exhibit GMCE properties have a first order transition and suffer intrinsically from a large thermal hysteresis. Very recently, we have demonstrated the possibility this thermal hysteresis is suppressed in MnAs thin films epitaxially grown on GaAs when making use of the impact of slow highly charged ions under well-controlled conditions. By the light of these very promising pioneer results, further investigations are needed in MnAs, and other potential thin films with GMCE properties will be investigated as well. These studies will be conducted in our laboratory equipped with the state-of-the-art instrumentation for sample characterization. They will also benefit from our expertise in the production of specific nanostructured substrates as well as in the physics of dynamics of highly charged ion beams with matter.

Applications with CV, statement of motivation and names and contact information of one or two referees must be sent to:

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before February 28, 2014 (sharp deadline)