Stage N° : 14

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Title
Antiferromagnetic spintronics

Keywords
spintronics, nanomagnetism; antiferromagnetic

Summary
Antiferromagnetic materials (antiparallel alignment of the atomic magnetic moments) could represent the future of spintronic applications thanks to the numerous interesting features they combine: they are robust against perturbation due to magnetic fields, produce no stray fields, display ultrafast dynamics and are capable of generating large magneto-transport effects. Intense research efforts are being invested in unraveling spin-dependent transport properties in antiferromagnetic materials. Whether spin-dependent transport can be used to drive the antiferromagnetic order and how subsequent variations can be detected are some of the thrilling challenges to address.

Details of subject
The purpose of this internship is to study the spin dependent properties and functionalities of antiferromagnetic materials. The main challenges are to quantify and understand the spin-dependent transport in antiferromagnetic materials and particularly the parameters that govern it. The nature of the elements constituting the antiferromagnetic material and the quality of the interfaces will be the adjustable parameters. We will consider mainly the efficiency of spin injection and the interfacial filtering, the absorption of spins in the core of the material and the absorption characteristics lengths, the order temperatures and the magnetic susceptibility, and the efficiency of the spin-orbit coupling via the spin Hall effect.

This internship is experimental. It will build on the many techniques of fabrication and characterization at SPINTEC and benefit from the collaboration with the SYMMES/RICC CEA laboratory for experiments with a resonant cavity.

For more information on antiferromagnetic spintronics, feel free to visit the following link, which reviews research conducted around the world on this theme: http://arxiv.org/abs/1606.04284

Requested skills
Internship for Master 2 students (materials science, solid state physics), fluent in English or in French

Possibility to follow with a PhD
Yes