

## Measurement of the dynamic coupling via a pure spin current

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**PhD may follow:** Yes

### Summary :

The purpose of this training is to measure the coupled dynamics transmitted by a pure spin current between two nano-objects made of magnetic insulators and connected by a normal metal.

### Full description :

One of the potential field of application of magnetic nano-objects are communication technology where magnetism is exploited for its non-reciprocal properties, combined with a wide tunability and very high selectivity. The expected properties depend greatly on the choice of the material. So far the best results have been obtained on yttrium iron garnet (YIG) films found nowadays in many high-end microwave components. France has in this area a unique expertise in the manufacturing of thin films of YIG of the highest dynamical quality. Very recently, the first nano-size YIG-based devices have appeared opening a very large field of potential applications for the wireless industry. We offer a training on the study of the dynamical properties of these nano-objects. The intern will have access to the best YIG thin film worldwide. The objective will be to pattern them with modern nanolithographically techniques using the PTA platform in Grenoble. In the next step, we will then perform fundamental studies on the dynamical properties of these nano-objects when inserted in an electronic device. In particular we will focus on the dynamical coupling transmitted by a pure spin current flowing in the normal metal. The goal is to understand the basic physical phenomena at the origin of an electronic control of their dynamical properties.

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### Requested skills :

Motivated student with a sound background in solid state physics and/or nanosciences and keen to explore new concepts and ideas that are at the interface between physics (spintronics) and applications (microwave components).