

CEA - Saclay 91191 Gif-sur-yvette Cedex  
**Service de Physique de l'Etat Condensé**  
**SÉMINAIRE**

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**Mercredi 7 novembre 11h15**

**Orme des Merisiers SPEC Salle Itzykson, Bât.774**

**The Spin Torque Lego**  
**from spin torque oscillators to artificial synapses devices**

**Julie Grollier**

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We will discuss some experiments dealing with the transition between a static and a flowing athermal system. In a first part, we will Discover in 1996 [1], the spin transfer effect allows to manipulate the magnetization of nano-devices by transfusion of angular momentum from a spin polarized current. Due to the rich scale of possible applications, as well as the new physics at stake, the spin transfer effect has sparked off many fundamental and applicative studies.

In particular, thanks to recent advances on this topic, the next generation of magnetic random memories (STT-RAM), expected to be out on the market in less than three years, will use this phenomena to write the magnetization state encoding the 0 or 1. But spin transfer offers more options than just building digital memories.

During this talk, after a brief introduction on the physical origin of the spin transfer effect, I will show that spin transfer can allow to implement a wide range of multi-functional devices, such as non-linear nano-oscillators, controlled stochastic switches, and spintronic memristors (artificial synapses). All these functionalities can be obtained using the same magnetic stack, just by tuning the shape and bias conditions, which opens up unique opportunities to combine them in non-conventional computing architectures.

[1] J. C. Slonczewski, J. Magn. Mater. 159, 1 (1996) & L. Berger, Phys. Rev. B 54, 9353 (1996)

A coffee break will be served at 11h00. The seminar will be given in English.

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