



Séminaire invité– Lundi 30 Juin 2014 (10:30)

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10H30

Spin-dependent phenomena at the interface of non-magnetic conductor and magnetic insulator

Magnetic insulators play an increasingly important role in spintronics and condensed matter physics. Although it does not conduct electricity, when a magnetic insulator is in proximity with a conducting material, it can induce interesting spin-dependent transport phenomena. In this talk, I will present several such phenomena at the interface of non-magnetic conductor and yttrium iron garnet or YIG. If the non-magnetic conductor has strong spin-orbit coupling, the spin current generation and reflection can cause a spin Hall magnetoresistance in addition to the anisotropic magnetoresistance. If the conductor is a single-layer graphene, the magnetic proximity effect at the interface of graphene/YIG induces ferromagnetism and spin polarization in graphene.

Ferromagnetic graphene is expected to exhibit unique ground states such as spin superconductivity and quantized anomalous Hall state. I will show our first demonstration of ferromagnetic graphene using the proximity effect approach and discuss the physical origin of the anomalous Hall effect.