SEMINAIRE ISMO

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Imaging magnetism with a scanning NV magnetometer at cryogenic temperature

The ability to map magnetic field distributions with high sensitivity and nanoscale resolution is of crucial importance for fundamental studies ranging from material science to biology, as well as for the development of new applications in spintronics. Recently, it has been shown that these problems can be tackled by scanning NV magnetometry. This technique relies on the optical detection of the electron spin resonance (ESR) associated with a single Nitrogen-Vacancy (NV) defect in diamond attached to an AFM tip. In particular, we have demonstrated quantitative imaging of magnetic nano-structures at room temperature. Extending this technique to cryogenic environment will open the way to the study of complex magnetic phenomena in condensed matter systems, such as superconductivity or strongly correlated electrons systems.

Here we will present our recent realization of a scanning magnetometer based on NV centers in a nanodiamond, in a low-temperature setup which combines atomic force microscopy and optical confocal microscopy. This scanning NV magnetometer has been applied to the imaging of magnetic domain walls in GaMnAsP, a semiconductor with a Curie temperature around 100 K which displays dilute ferromagnetism so that spin-polarized electrical currents can reverse the magnetization direction of the magnetic domains through torque.

Le séminaire sera donné en Anglais

Mardi 28 mars 2017 à 11h

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