

Electric field control of magnetization in spintronic devices – Towards low power consumption devices

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PhD may follow: Yes

Summary :

Spintronics is based on the control of magnetization of magnetic layers. Usually, this control is performed with a magnetic field or via the spin transfer torque effect, both methods needing very large currents applied in the device, ie. the magnetic tunnel junction (MTJ).

Electric field assisted writing allows reducing these critical currents. This effect is based on magnetic anisotropy variations and is thus expected to strongly depend on temperature. The function of a device may thus be lost if the temperature is raised by only 20Å°C.

The objectives of this internship are to study temperature variations of electric field assisted writing of typical MTJs and to optimize these structures in order to enlarge the operating temperature range required by the industrial application.

The student will perform at SPINTEC nanofabrication of the MTJs, will measure the dependence of magnetoresistance with electric field in order to quantify electric assistance. He/she will then measure this effect in temperature and will start the optimization of the structure to obtain the required operating temperature range.