



Séminaire Eric E Fullerton

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Wednesday September 7th 2022 at 11h00
Salle Patrick Alnot (4-A014)

Crystal symmetry dependent magneto-transport properties of epitaxial films

I will discuss anisotropic magnetoresistance (AMR), anomalous Hall effect (AHE) and planar Hall effect (PHE) measurements of epitaxial CrPt_3 , hcp Co and hcp Ho films. These magneto-transport properties are typically described as dependent on the angle of magnetization relative to the current. However, we find that for these materials there are unusual magneto-transport properties that depend strongly on the direction of the current (I) and the applied magnetic field (H) relative to specific crystallographic axes. As an example, for epitaxial $\text{Co}(0002)$ and $(10\bar{1}0)$ films the AMR, AHE and PHE depend strongly on the orientation of I relative to the Co c -axis. At low temperatures the AMR is highest (14%) when $I \parallel c$ – axis and the angular response depends on the angle of H relative to the c -axis and not the current. At room temperature the highest AMR arises when I is 50 degrees from the c -axis whereas the anomalous Hall conductivity is largest when $I \parallel a$ – axis. For $\text{Ho}(0001)$ films we observe the presence of the helical antiferromagnetic phase below $T_N=132$ K that transitions to the conical ferromagnet phase at $T_C=20$ K. In the helical phase the high field AMR in the basal plane possesses sharp delta-function-like six-fold symmetric peaks in the AMR whenever H is parallel to the a -axis. I will discuss recent theoretical calculations that highlight possible physical phenomena that explains these findings. This work is in collaboration with Yuxuan Xiao, Younghyuk Kim, Rajasekhar Medapalli, and Matthew Gilbert.

Séminaire organisé dans le cadre du projet MUSE3

