



## DR. DAMIEN LE ROY

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### Exchange Anisotropy in $\text{Ni}_x\text{Cu}_{1-x}$ and Co Nanoclusters Deposited on CoO (111) Layers

In this talk, we report on exchange anisotropy in cobalt and nickel-copper nanoclusters (4 nm) deposited on CoO (111) layers. Single clusters measurements of the angular dependence of low-temperature switching field were performed using a microbridge DC superconducting quantum interference device (microSQUID). The recent improvements of this technique enabled us to perform the first magnetization curves measurements on single nanoclusters.

The structural and intrinsic magnetic properties of the clusters are presented. Co nanoclusters magnetism is well described by the Stoner-Wohlfarth model. The first magnetic study of nickel-copper nanoclusters covering the whole range of ferromagnetic compositions is presented. Those particles exhibit a lower magnetization than in bulk, which could be attributed to their icosahedral structure and to the local environment of their surface atoms. The structural properties of CoO (111) layers were studied by X-ray diffraction. Combined with AFM observations, a structural anisotropy in AF films is shown, partly attributed to a substrate miscut.

We then present F/AF exchange coupling investigations in an ideal system with F cluster deposited on single AF domain. The coupling induces modification in clusters anisotropy with strong exchange bias. A preferential orientation is observed with a bistable state. It is shown that the ferromagnet is strongly coupled with the antiferromagnet with a spin-flop configuration.

*Dr. Le Roy will present results from his thesis carried out with Wolfgang Wernsdorfer and Robert Morel at CNRS, Grenoble.*

**Thursday, December 10, 2009**  
**201 Brace Lab**  
**4:00 p.m.**

**Host:**  
**Professor**  
**David Sellmyer**  
**NCMN**

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