LNCMI

LNCMI-Grenoble

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Electron spin resonance in 2D conductors

Niveau: Master 2

Summary *(400 caractères maxi)*

Spin properties of systems with reduced dimensions (or "nano systems") are of colossal interest both from a fundamental point of view (the search for new quantum phases) and from application perspectives (information storage and transfer). The central part of this work will be to develop and use new experimental tools in the area of resistively-detected magnetic resonances, to study the physics of new emerging 2D systems. The successful candidate will join the "low dimensional systems and quantum transport group" at LNCMI, focusing on the experimental study of new 2D materials (metallic, semi, or superconductors), carbon allotropes, topological insulators, with strong international collaborations.

Detailed subject *(1200 caractères maxi dont une figure possible)*

Among existing experimental techniques, magnetic resonances constitute a powerful tool to probe and manipulate states of matter. However, those are difficult to apply to nano-systems where the small amount of resonating particle leads to very weak signals, which in general cannot be measured by conventional techniques. Our group has recently developed a new technique based on a "resistive" detection of electron spin resonance which can be applied to quasi-2D conductors of moderate quality, possibly showing superconducting behaviors. We propose in this internship to investigate with this technique the mechanism of superconductivity in the 2D limit in different kinds of materials: disordered superconductors, and atomically flat (strictly 2D) ones.

Publications linked to the theme

Background and skills expected :

Candidates should have a good background in solid state physics and a strong motivation for experimental condensed matter Physics in extreme conditions (low temperatures, high magnetic fields).

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UGA Université Grenoble Alpes

EMFL European Magnetic Field Laboratory