Postdoc position at the LNCMI-Toulouse

The Laboratoire National des Champs Magnétiques Intenses is a large-scale facility enabling researchers to perform experiments in the highest possible magnetic fields. Continuous fields up to 36,5 T are available at the Grenoble site (LNCMI-G) and pulsed fields up to 98,8 T at the Toulouse site (LNCMI-T).

Major breakthroughs in science have been achieved at LNCMI-T due to the improvement of electronic and sensitive measurements. Back in 2007, the development of an experimental setup to measure transport properties of very conductive metals with an unprecedented resolution in pulsed fields has led to the discovery of quantum oscillations in underdoped high T_c superconductors [1]. More recently in 2016, by performing high field Hall effect measurements up to 88 T in the low-temperature normal state of high T_c superconductors, we have shown that the electronic structure of cuprates undergoes a radical change, with the number of electrons plummeting six-fold, a signature of a quantum phase transition [2].

To go beyond the state of the art, one needs to use the technique called Megagauss that allows one to reach 200 T and more [3]. This installation uses a fast capacitor discharge into a self-destructive single-turn coil to produce pulses up to 260 T in 8 mm diameter suitable for low-temperature experiments but at drastically reduced measurement times (a few µsec). We propose to develop a new strategy to improve highly sensitive transport measurements in strong magnetic fields. To get a reliable signal / noise ratio and to reduce the eddy current heating, the sample must be optimally tailored. One way to achieve this goal is to take advantage of the focused ion beam technique (FIB) used for the ablation of materials. The goal is to shape the sample to miniaturize it and to get a better geometric factor for magnetoresistance measurements.

We are looking for highly motivated and independent scientist with a PhD in experimental physics. Specific experience in condensed matter science and clean-room techniques is necessary. Experience with the FIB technique and sputtering systems is an advantage. Good communication skills in English, both written and oral are a requirement. The successful candidate will be in charge of the ablation of the sample by the FIB technique and of the characterization and the measurement in high magnetic fields. This project will be achieved in close collaboration with the department of 'sample preparation' at the CEMES [4].

The position can start January 1st, 2018 for one year with a possible extension.
The salary will be according to the CNRS scales.

Persons to contact:

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http://www.toulouse.lncmi.cnrs.fr/spip.php?page=rubrique&id_rubrique=68&lang=en

[1] N. Doiron-Leyraud *et al.*, *Nature* **447,** 565 (2007).
[2] S. Badoux *et al.*, *Nature.* **531,** 210 (2016).
[3] http://www.toulouse.lncmi.cnrs.fr/spip.php?page=article&id_article=179&lang=en
[4] http://www.cemes.fr/Sample-preparation-service?lang=en