Postdoc position at the LNCMI-Toulouse

The Laboratoire National des Champs Magnétiques Intenses is a large-scale facility enabling researchers to perform experiments at the highest possible magnetic fields. Continuous fields up to 37 T are available at the Grenoble site (LNCMI-G) and standard pulsed fields up to 98.8 T (time duration ~ 50 ms) at the Toulouse site (LNCMI-T).

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

To go beyond the state of the art (magnetic field higher than 100 T), one needs to use the technique called Megagauss that enables 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 an 8 mm diameter. This is suitable for low-temperature experiments but at the cost of a drastically reduced measurement duration (a few µsec) compared to standard pulsed fields.

We are currently developing transport measurements in the Megagauss facility. To get a reliable signal-over-noise ratio requires building a high frequency (~ 1 GHz) measurement system. In addition, to reduce eddy current heating and improve the geometric factor, the sample must be optimally tailored using a focused ion beam microscope (FIB).

The successful candidate will be part of the "Strongly Correlated Electron" group (5 persons) and will be in in charge of

i) contributing on the development of the transport measurements in the Megagauss facility.

ii) performing high field transport measurements of several high temperature superconductors in pulsed magnetic fields.

iii) providing technical and scientific support for users of the pulsed field facility (local contact for 25 % of the time).

We are looking for highly motivated and independent scientists with a PhD in experimental physics. Specific experience in condensed matter physics, low-temperature techniques, and measurements in magnetic fields would be appreciated. Good communication skills in English, both written and oral are a requirement.

The position can start in October 2021 or later, for one year, with possibility of an extension. The salary will be determined in accordance with the CNRS scales.

Persons to contact:

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[1] N. Doiron-Leyraud *et al.*, *Nature* **447,** 565 (2007)
[2] S. Badoux *et al.*, *Nature.* **531,** 210 (2016)
[3] http://lncmi.cnrs.fr/la-recherche/magnet-materials-technology/semi-destructive-pulsed-fields-beyond-100-t/