

Open Postdoc position at the French National High Magnetic Field Facility

Strain tuning of quantum materials in high magnetic fields

Project - Strain is a fundamental parameter in solid state physics. It can be used to control the ground state of correlated electron systems. It can also be used to control the band structure of metals.

The aim of the research project is two-fold. First, it is to bring new information about the mysterious pseudogap phase of high- T_c cuprate superconductors. Strain tuning will be used to detect rotational symmetry breaking, and also to control Fermi surface topology. With high magnetic fields, it will be possible to study the effect of strain in the normal state down to the lowest temperatures. Second, it is proposed to use strain in order to control the band structure of semimetals. For instance, graphite is very dilute metal with a carrier concentration $n=3e18\text{cm}^{-3}$. Strain can be used to change this concentration. Graphite is known to host a series of phase transition in high fields, towards a charge ordered state featuring topologically non-trivial states. The project aims at studying the impact of strain on this ordered state.

Research Environment - The project will be carried out in a group composed of one CNRS researcher, one PhD student and several undergraduate interns. The group is equipped with a 20 T superconducting magnet. The CNRS site in Grenoble has world class environment for research in strongly correlated systems. The group is in close collaboration with leading experts in the field of quantum materials including specialists in crystal growth. The group is part of the French high magnetic field facility in Grenoble (Laboratoire National de Champs Magnétiques Intenses, LNCMI), which is part of the European Magnetic Field Laboratory (EMFL). The laboratory provides access to DC magnetic field up to 36 T and pulsed fields up to 98.8 T. The laboratory has very strong technical capabilities (cryogenics, electronics, machine shop...).

We are looking for a talented and motivated postdoc collaborator interested in this experimental condensed matter physics project. The project has a secured one-year financial support for a postdoc, which can be extended up to two years. If you are interested do not hesitate to contact us (see email below).

Starting date: as soon as possible.

Related recent publications:

Thermodynamic signatures of the field-induced states of graphite

D. LeBoeuf, et al. accepted in Nat. Comm., Preprint available at arXiv:1705.07056

High field charge order across the phase diagram of YBCO

F. Laliberté, et al., Preprint available at arXiv:1705.07763

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