

## Post-Doc Position : Extreme conditions instrumentation and studies

The PHELIQs laboratory in the CEA Grenoble, in collaboration with the LNCMI Toulouse CNRS laboratory, has an open post-doc position to develop instrumentation and to perform experimental studies under high pressure and pulsed magnetic fields.

Combining extreme conditions of low temperature, high pressure, and magnetic field is crucial for numerous systems where the coupling between the electronic, magnetic and lattice degrees of freedom gives rise to fascinating properties, both from a fundamental and applications oriented point of view. Studies under pressure and static magnetic field are limited by the maximum fields available (about 35T in France today). Pulsed magnets can reach much higher fields, the world record is around 100T, but measurements under pressure in pulsed fields are a big challenge, and so far are not routinely available. In collaboration with the CNRS LNCMI Toulouse. We have explored a novel approach, and a successful prototype has been built and used to measure magnetoresistance in pulsed fields up to 60 T, pressure up to 5 GPa, and temperatures down to 1.5 K[1]. This prototype will allow the candidate to quickly learn the technique and perform tests and measurements. A large part of the task will be to implement and test improvements, with the aim to achieve lower temperatures, higher pressures, and higher fields, but also create a reliable and easy to use device. In collaboration with the CEA/DAM/DIF Laboratory, we will also test a miniature diamond anvil cell in pulsed field, opening the prospects of much higher pressures.

These novel measurements will be valuable in a wide range of domains. From the outset we will combine tests of the new developments with measurements on samples of physical interest. The choice of which studies to undertake will be made with the candidate: Topics that are of interest include magnetism of strongly correlated systems, high-Tc superconductivity, correlation driven insulators (Mott or Kondo), and topological systems. Complementary measurements may be carried out in the CEA Grenoble laboratory allowing the candidate to make and publish rather complete physical studies as well as gather expertise in the field of extreme condition instrumentation.

The position is for 18 months (possibly extendable to 24). The candidate will be based in Grenoble but will work in continuous coordination with the LNCMI, and will make frequent trips to Toulouse for tests and measurements in pulsed field (typically 2-4 trips of 1-4 weeks per year. Expenses will be covered).

Starting date is January 1<sup>st</sup> – March 31<sup>st</sup> 2019.

Contact Daniel Braithwaite ([daniel.braithwaite@cea.fr](mailto:daniel.braithwaite@cea.fr), +33 4 38784411)

[1] D. Braithwaite, W. Knafo, R. Settai, D. Aoki, S. Kurahashi, and J. Flouquet, Review of Scientific Instruments **87** (2016).