

Postdoctoral Position in Experimental Condensed Matter Physics

Laboratoire Charles Coulomb – UMR-CNRS 5221–University of Montpellier
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Physics of the glassy state Group
<https://www.coulomb.univ-montp2.fr/-Equipe-Physique-des-Verres->

High-pressure-high-temperature polymorphism of oxide materials

Applications are invited for a Postdoctoral position in Condensed Matter Physics and Earth's Science.

The post is available for a fixed-term duration of 12 months, based in France for the full duration with the work taking place at Laboratoire Charles Coulomb, University of Montpellier, France.

The project proposes to use advanced optical spectroscopy and structural experiments at high-pressure-high-temperature to first characterize the Fe–O reactivity and second to unravel mechanisms of polymorphism in simple oxide glasses.

The successful candidate will conduct HP-HT vibrational spectroscopy (infrared, Raman) experiments on Fe–O compounds using diamond anvil cells and an in-situ laser heating system (1500-4000 K; 10-100 GPa). Iron oxides of original stoichiometries can be obtained under extreme conditions and they are abundant constituents of the Earth's mantle and its core. These new compounds are also interesting for their electronic and magnetic properties. The candidate will also participate in the structural characterization of the Fe–O reactivity at HP–HT at large scale facilities (ESRF, SOLEIL, PETRA, Spring-8, APS) in close collaboration with teams at ICG Montpellier and at the Bayerisches Geoinstitut. In parallel, the candidate will conduct HP-HT Brillouin experiments to achieve an accurate description of the microscopic mechanism of pressure-induced polyamorphism in representative oxide glasses (GeO_2 , B_2O_3). Simple oxide glasses form an excellent playground to study polyamorphism as both intrinsic free volume and network topology effects can be addressed. Understanding and describing the structure and properties of the glassy state poses enormous difficulties and remain a fundamental problem in condensed matter physics. This part is further developed in close collaboration with a team at IMPMC, Paris, where numerical modeling is carried out to complement the experiments.

Applicants should possess, or be very close to obtaining, a doctorate in condensed matter physics or in material science and ideally a background in vibrational spectroscopy. Previous experience in high pressure techniques would be an advantage.

How to apply

- Please send a cover letter, complete CV, copy of Diploma and reference letters to benoit.ruffle@umontpellier.fr and bernard.hehlen@umontpellier.fr
- The position is available for 12 months starting **01 October 2021**
- Funding from the French ANR

