



Engineer in experimental geophysics

Job offer from the institut de physique du globe de Paris | CNRS UMR 7154

Category	A
BAP	B – Sciences chimiques et sciences des matériaux
Rank	Research or study engineer
Job – type REFERENCE	B1A41 ou B2A41 -Research or study engineer in physical measurements
Duration	12 month
Affectation	IPGP - Site Cuvier
Salary	2600 et 3100 € before tax, commensurate with experience (<=3 years, up to 10 years)
Date of publication	01/02/2023
Starting date	As soon as possible
Location	IPGP - 1, rue Jussieu - 75238 Paris Cedex

The institut de physique du globe de Paris

A world-renowned geosciences organisation, the IPGP is associated with the CNRS and an integrated institute of the Université Paris Cité. Bringing together more than 500 people, the IPGP studies the Earth and the planets from the core to the most superficial fluid envelopes, through observation, experimentation and modelling.

The research areas are structured through 4 main unifying themes: Interiors of the Earth and Planets, Natural Hazards, Earth System and Origins.

The IPGP is in charge of labelled observation services in volcanology, seismology, magnetism, gravimetry and erosion. And the IPGP's permanent observatories monitor the four active French overseas volcanoes in Guadeloupe, Martinique, Réunion Island and Mayotte.

The IPGP hosts powerful computing resources and state-of-the-art experimental and analytical facilities and benefits from first-class technical support. The IPGP provides its students with geosciences training that combine observation, quantitative analysis and modelling, and that reflects the quality, richness and thematic diversity of the research conducted by the IPGP teams.

Team Department

The CAGE team (Cosmochemistry, Astrophysics, and Experimental Geophysics) brings together researchers and teachers with common research foci aimed at the formation of the solar system and its early evolution, the formation of the Earth, its differentiation and its ancient geologic history. Our team uses interdisciplinary methods and complementary skillsets to explore the origin of the solar system, Earth, and life. Our work includes astrophysical numerical modeling, studies of extraterrestrial matter, isotope geochemistry, mineralogy, high-temperature and/or high-pressure physicochemical modeling, along with other congruent fields.



The team members are very involved in IPGP's development of experimental methods using piston-cylinder, multi-anvil, and laser-heated diamond anvil cell apparatus, aerodynamic levitation heating, controlled atmosphere observations (SEM, FEG FIB), and analytical development of IPGP's mass spectrometers (MC-ICP-MS Neptune, Triton TIMS, Nobility & HelixSTT for rare gases and in situ coupling with laser ablation). Numerical simulations at IPGP are developed using two computing clusters that comprise our S-CAPAD system. Additionally, our team has open access to ionic probes through INSU's national service and CRPG (Nancy), as well as various lines of synchrotron radiation (ESRF, APS, DESY). Along with a broad range of geochemical projects, our team members are actively involved in many other research topics and projects including chemical geodynamics of the Earth and major Archean geochemical cycles, the structure and physicochemical properties of minerals and rocks in the deep Earth, and the application of isotopic analysis in medicine.

A detailed description of the team is available at <https://www.ipgp.fr/la-recherche/equipes/cage/>

The webpage of the project supervisor, Charles Le Losq, is visible at <https://charlesll.github.io>

Missions

In 2023, as part of the IVIMAP project that has been funded by the Labex UnivEarthS of the University of Paris Cité, the team will receive a new diamond anvil cell with dual-stage heating. This cell will complement existing devices to study the physical and chemical properties of high-pressure magmas. This new device thus opens doors to study an important question: what influence exerts pressure on the properties of a magma? Answering this question will require the coupling of new experimental data with existing ones, in order to integrate the effect of pressure in the i-Melt model of the properties of magmas, which is based on the coupling of deep learning with thermodynamic modelling (see e.g. <https://medium.com/pytorch/from-windows-to-volcanoes-how-pytorch-is-helping-us-understand-glass-8720d480f4f2>).

As part of this contract, the engineer will be responsible for:

- participating in the development and operation of the diamond anvil cell device, as well as the acquisition of data during its use. The objective will be to develop this method and to provide new *in situ* data in order to better understand the influence of pressure on the properties of magmatic liquids.
- participating in the installation, operation and maintenance of the new piston-cylinder press, which will be used for the synthesis of samples.
- providing assistance to users during experiments.

Activities

> The engineer will have the following activities:

- Ensure the installation, operation and maintenance of the new diamond anvil cell
- Ensure the installation, operation and maintenance of the piston-cylinder press
- Provide technical advice to users (students and researchers).
- Ensure compliance with safety instructions and rules.

Expected Skills

> Knowledge:

- General knowledge of physical measurement techniques and their metrology
- Knowledge of high pressure techniques (piston-cylinder and/or diamond anvil cells) appreciated
- Knowledge and skills in the development and programming of control automata would be appreciated
- Knowledge of Health and Safety rules specific to the field of activity

> Know-how:

- Establish a diagnosis during a breakdown
- Write reports or technical documents



- Ensure a technological watch
- English language: B2 level, daily interactions with English-speaking team members

> Computer tools

- Master common computer programming tools: Matlab, Python
- Master common office automation and communication tools
- Master the Linux operating system

> Professional qualities

- Sense of commitment
- Be rigorous, methodical and organized
- Ability to work in a team
- Initiative
- Autonomy

The candidate must also adhere to strict compliance with the ethical principles surrounding the activities of IPGP engineers, including the principles of equality, equity, impartiality, probity, integrity, neutrality and non-discrimination.

Obligations and risks

> Schedules

The work will be done on the time slots defined by IPGP internal reglementation, from Monday to Friday.

No teleworking possible: laboratory experiments requiring presence 5 days out of 5.

> Risks

The work will be done in a laboratory environment with potential electrical, chemical, cryogenic and burn risks.

Training and experience required

- > Minimum of 2 years experience
- > Education level or diploma : Master, engineer or Ph.D diploma

How to apply

- > CV and cover letter, with details on technical expertise and know-how in relation to the offer
- > Deadlines for applications : 01/04/2023
- > Contacts (2 contacts are required for the interview)

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