

Postdoctoral Fellow

Department: Physics Department, EPFL, Lausanne, Switzerland.

Salary: 84000 CHF/year (84903 EUR/year)

Location: Physics Department, EPFL, Lausanne, Switzerland.

Duration: 2 years

Position Summary

The LQM laboratory, Physics Department at EPFL, is seeking a Postdoctoral Fellow to study the high-pressure-temperature behavior of natural gas hydrates.

The project will focus on the high-pressure-temperature structures, stability range, and proton dynamics of natural gas hydrates (NGH) (mainly H₂, CH₄, CO₂), with applications to gas storage and to modeling of icy moons and planets. NGHs are constituted by hydrogen-bonded H₂O polyhedral cages, structurally similar to fullerenes, hosting gas molecules in their interior, are common on Earth in oceanic shelves and permafrost regions, and are particularly fascinating for their potential energy and environmental applications. Their thermal transport properties under HP conditions encountered in the largest icy moons and the newly discovered water-rich exoplanets are fundamental for their description, as clathrate hydrates naturally form in the water-rich interior of those bodies, potentially storing huge amount of volatiles. Pressure is a key parameter in the study of NGHs as it remarkably increases the temperature range of their stability and their gas uptaking by inducing substantial variations in the water-gas distances, promotes structural transitions through gas-rich structures and new gas-water interactions, and can accelerate gas exchange phenomena (such as CH₄-CO₂ exchange). The project will involve using a combination of experimental techniques, including X-ray and neutron diffraction, quasi-elastic neutron scattering, and Raman spectroscopy.

Desired Qualifications:

- Ph.D. in Physics, Chemical Physics, Materials Science, Geophysics or a related field.
- Strong hands-on experimental skills and ability to work independently and collaboratively in a group environment.
- Expertise with high-pressure experiments, neutron diffraction or x-ray, Raman scattering.

Additional Information:

- The initial appointment is for one year, with the possibility of one additional year pending progress (funds available). The position is expected to be available starting 1st January 2022.

Application Materials Required:

- Cover Letter

- Curriculum Vitae (including publications)
- Statement of research interests, and the contact information of three references.
Inquiries can be sent to Livia E. Bove (livia.bove@epfl.ch) before December 1st.