



## Postdoctoral research officer position -

Superradiance in cold rubidium confined in a hollow core photonic crystal  
fiber

---

Organisation: University of LIMOGES

Research Field: Physics - Optics

Application deadline: 15 Dec 2022

Offer starting date: 01/02/2023

Responsible to: Prof. Fetah Benabid

Location: Xlim Institute

123, avenue Albert Thomas, Limoges 87060, France

Type of contract: Temporary

Job status: Full-time

EU research framework: H2020 / FETOPEN

### Job description:

To undertake a research project in a multi-disciplinary field at the frontier of atoms physics, fibre-photonics, cold atoms and lasers. The post-doctoral project aims to demonstrate superradiance in cold rubidium confined in a hollow core photonic crystal fiber, and assess it for the development of ultra-stable laser source. The research program requires (i) micro-confining and laser cooling rubidium atom inside the core of a hollow core fiber, (ii) exploring cooperative effects and (iii) generation and characterization of superradiance. The project is part of the FETOPEN project CRYST<sup>Λ</sup>3 funded by the European Research Council.

*The position is part of the European project CRYST<sup>Λ</sup>3. The latter aims to create a paradigm shift in the field of miniaturized quantum sensors. This implies, among other, (i) building an alkali-atom*

*photonic-technology by tailoring HCPCF and PMC to the requirements of quantum sensing applications and accelerating their time-to-market; (ii) building innovative tools -and achieving seminal experimental demonstrations- for in-fiber cold-atom science and technology at the frontier of photonics, ultra-cold atoms and QED.*

*For more information on the project, visit the website : [www.cryst3.com](http://www.cryst3.com)*

*This post-doctoral work will be undertaken at the Gas-Phase Photonic and Microwave Materials group (GPPMM) at Xlim CNRS research Institute, University of Limoges, France. The GPPMM is world-renowned research group for its mix of experimental and theoretical investigations into new hollow-core photonic crystal fibres (HC-PCF) and their applications in nonlinear and quantum optics applications. The group works in an inventive and highly interactive environment, with internal interactions being complemented by active international collaborations. Limoges is a pleasant and attractive city in the west-central France, close to Bordeaux and 3 hours by train from Paris.*

*A position is available and involves undertaking an original research project in experimental, numerical or theoretical atom optics in hollow-core photonic crystal fibres in an exciting and interdisciplinary environment. The research program requires mastering the following three disciplines: (i) photonic crystal fibre, (ii) atom optics and (iii) laser metrology.*

### **Duties and Responsibilities:**

1. To work with others in the Gas-Phase Photonic and Microwave Materials group to design, fabricate and characterise hollow-core photonic crystal fibres (HCPCF) tailored for atom and cold atom optics.
2. To work on optical experiments involving cold atom, HCPCF and signal processing.
3. To prepare written reports for the project, to attend project meetings, and to interact with other parties involved in the project.
4. To prepare scientific papers for publication, both in international journals and at conferences. To attend conferences in order to present the results of research and to interact with the broader scientific community.
5. To work on related scientific projects as required
6. To report on a regular basis to the project investigator.

*The prospective postdoctoral fellow should have a background in one or more of the following: fibre photonics, nonlinear and quantum optics, atom optics and laser metrology. We accept*

applications where the PhD degree is not yet granted but nearing fulfilment. Duration of appointment: 2 years, with potential extension of one year.

For more information on the position please contact Prof Fetah Benabid ([f.benabid@xlim.fr](mailto:f.benabid@xlim.fr), in Cc [benoit.debord@xlim.fr](mailto:benoit.debord@xlim.fr)), send CV and motivation letter.

**Skills/Qualifications:**

- REQUIRED LANGUAGES : ENGLISH: Excellent, FRENCH : Desired
  
- QUALIFICATIONS : PhD or equivalent level in optics, atom optics or photonics-related discipline
  
- EXPERIENCES/KNOWLEDGE :
  - Experimental optics
  - Optical fibres
  - Laser metrology
  - Atom optics
  - Spectroscopy
  
- SKILLS :
  - Time management
  - Team work
  - Scientific writing
  
- ATTRIBUTES:
  - Team worker
  - Motivated
  - Initiative
  - Ability to communicate