Postdoc offers

Quantum PhD & Job Fair / Forum des thèses et métiers du quantique
November 13, 2024
Sorbonne University, 4 place Jussieu, 75005 Paris

Post-doc position: spin-photon interfaces for quantum information

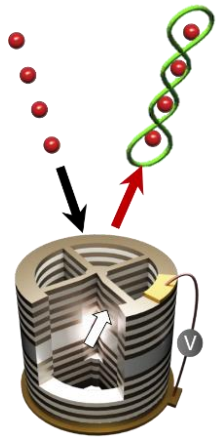
Location: Center for Nanoscience & Nanotechnology – Palaiseau (south of Paris Area)

Duration: 24 months, preferentially starting in early 2025

Gross salary: between 3081.33 € and 4291,70 € per month (depending on experience)

Contacts
Loïc Lanco (loic.lanco@u-paris.fr),
Olivier Krebs (olivier.krebs@c2n.upsaclay.fr)
Pascale Senellart (pascale.senellart-mardon@c2n.upsaclay.fr)

Our group on Solid-State Quantum Optics, at the Center for Nanoscience & Nanotechnology, has developed a strong expertise in harnessing light-matter interaction at the most fundamental level. We develop crucial resources for optical quantum technologies, including high-performance single-photon sources [1]. In parallel, we have developed **efficient interfaces between a single material qubit** (the spin of a single charge in a semiconductor quantum dot (QD)) and **single photonic qubits** (the polarization of a single photon) [2]. We have also acquired an important expertise in the understanding of the quantum and solid-state physics governing the QD-photon interactions [3].



Such spin-photon interfaces have long been envisioned, for example, to engineer photon-mediated operations between distant spins, as well as spin-mediated operations between single photons. Our main objective is to develop experiments using these devices as **receivers of incoming photons**, as required for the future implementation of **deterministic spin-photon and photon-photon gates**. A crucial requirement, finally, will be to improve the spin coherence, i.e. **increase the memory time of the spin qubit**, for successfully entangling more and more photons with the same solid-state spin.

In the framework of the consortium OQuLus, gathering leading teams from 15 French laboratories, **we are looking for excellent post-doctoral candidates, with a PhD degree in quantum technologies, quantum optics, or solid-state quantum physics**. The successful candidate will be part of our research effort by devising and implementing experiments on our QD-based spin-photon interfaces, and participating to the management of PhD students and interns.

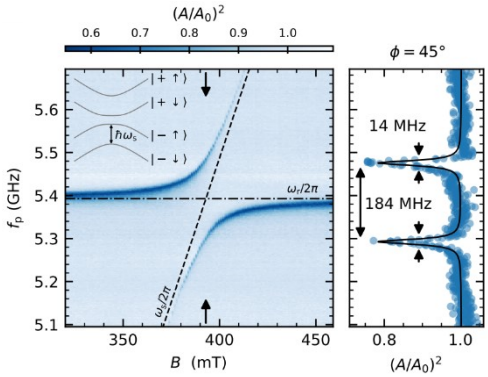
[1] Nature Photonics 10, 340 (2016); Nature Photonics 13, 803 (2019)
[2] Nature Communications 6, 6236 (2015); Nature Photonics 17, 582 (2023); Nature Communications 15, 598 (2024)
[3] Optica 4, 1326 (2017); Quantum Science & Technology 8, 025021 (2023); arXiv:2401.14976 (2024)

Hole spin circuit quantum electrodynamics

We are looking for a highly motivated and talented physics or engineering PostDoc with suitable experience to join our spin circuit quantum electrodynamics (cQED) team. Possible starting date: beginning of 2024 with a two-year contract and possible extension upon mutual agreement.

Project description:

Hole spin cQED has emerged as a new promising platform not only for quantum information processing but also for the study of fundamental light-matter interaction and analog quantum simulation. Our group has recently demonstrated large cooperativities between a single hole spin in a gate-define quantum dot in silicon and a photon in a microwave cavity [1]. Based on this achievement, the project will be on one hand to push the current light-matter interaction strengths to its extreme and study fundamental physics questions (ultra-strong and superstrong coupling regimes for example)[2] and on the other hand to leverage the photon as a quantum bus for long-distant spin-spin entanglement. Spin cQED with multiple spins coupled to the same microwave resonator naturally implement an all-to-all connectivity allowing for the study of various spin and impurity models. In addition, multi-cavity systems will be used to precisely engineer the environment of the spin to control and simulate bosonic baths in order to implement an analog quantum simulator [3] to answer longstanding questions of many-body physics.



Avoided crossing between a hole spin and a microwave photon showing the strong coupling between them.

[1] Yu*, Zihlmann* et al. Nature Nanotechnol. 2023; [2] Forn-Diaz et al. Phys. Rev. Mod 2019; [3] Kim et al. PRX Quantum 3, 040308 (2022)

Environment:

Our research group (www.lateqs.fr), hosted at CEA Grenoble, is part of the French national “Plan Quantique” and closely collaborates with in-house theory colleagues. The lab is located on a big scientific campus gathering not only CEA with its strong microelectronics research (300 mm clean room) but also other major scientific institutions such as CNRS (Institut Néel), ERSF (synchrotron), ILL (neutron source) and many high-tech companies as well as the University Grenoble Alpes.

Grenoble is a vibrant city offering many cultural activities, lovely bars and delicious restaurants. Located in the heart of the Alps it is the paradise for all outdoor enthusiasts.

Knowledge, skills and abilities:

PostDoc candidates are required to have a Ph. D. degree in physics or a related discipline (electrical engineering, nanosciences, ...). The successful candidate will bring a strong background in some of the following areas: quantum optics (semiconductor or atomic), superconducting qubits, mesoscopic physics, device nanofabrication, qubit control techniques, cryogenic experiments, experiment control and data acquisition. Strong python programming knowledge is a clear asset. French language proficiency is not necessary. The candidate will work within a team of researchers and will advise graduate and undergraduate students in their research projects.

How to apply:

To apply, please contact Simon Zihlmann by email (simon.zihlmann@cea.fr) including:

- a curriculum vitae (including prior research experience and skills acquired as well as names of potential referees)
- your academic records (Master’s and PhD diploma)
- a list of publications
- a short statement of your research interest and how it relates to the project

Experimental Quantum Physicist

A 2-year post-doctoral research position is available at the "LATEQS" laboratory of CEA – Grenoble [1]

About the job

We are looking for a highly motivated postdoctoral researcher to join our ongoing research efforts on advanced microwave superconducting devices based on NbN, a highly disordered superconductor. The position is available immediately, with a flexible start date, for a two-year contract and possible extension upon mutual agreement.

Project description

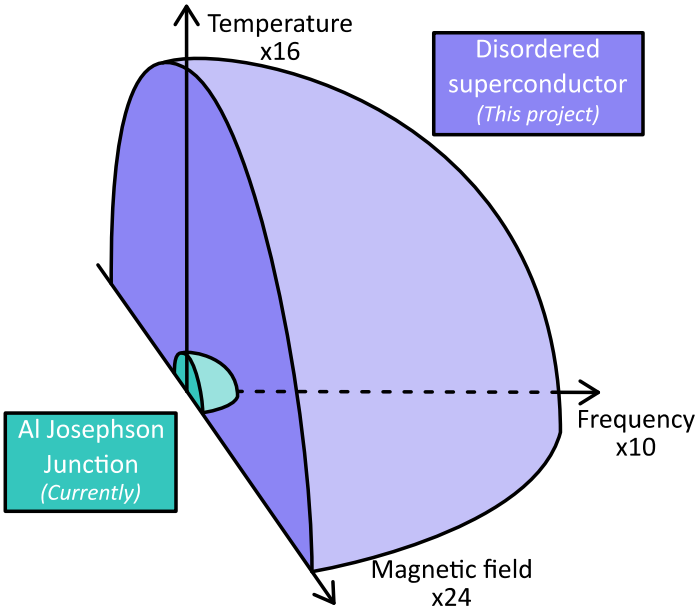


Figure 1: Schematics of the working range improvement as function of magnetic field, frequency and temperature for lossless microwave components made from the disordered superconductors NbN compared to those based on aluminum Josephson Junctions.

During the last decades, superconducting quantum circuits have shown impressive results fueled by the so-called circuit quantum electro dynamics (cQED) architecture where the quantum signal is carried by photons at microwave frequencies. cQED experiments often rely on the technology of aluminum Josephson Junctions (JJ's) which can be understood as non-linear inductors. The control of the non-linearity is at the heart of superconducting qubits, as shown *e.g.* by the emblematic "Transmon" qubit. Alongside superconducting qubits, this non-linearity allowed the development of numerous non-linear lossless microwave components (tunable resonators and couplers, quantum limited amplifiers (QLA), ...) which became essential tools for state-of-the-art cQED experiments. Yet, as a consequence of being built upon aluminum JJ's, all of these components are restricted to low magnetic fields ≲ 250mT, temperatures ≲ 250 mK and frequencies ≲10 GHz, strongly limiting the range of their application.

As illustrated in Fig.1, the use of disordered superconductors with a large superconducting gap such as NbN would alleviate these constraints by at least one order of magnitude [3].

The goal of the project is to demonstrate that the non-linearity of a large gap disordered superconductor, such as NbN, can advantageously replace Al JJ's to provide non-linear and lossless microwave components for spin-qubit experiments. A first project goal is the demonstration of a parametric amplifier based on NbN working under high magnetic field.

[1] LATEQS: https://www.lateqs.fr/
[2] PTA: http://pta-grenoble.com/fr/
[3] C. Yu, *et. al*, Nat. Nanotechnol., 18, 741-756 (2023)

Your tasks

- Fabricate [2] and measure your own microwave devices
- Supervise students working with NbN [3]
- Develop a strong synergy with other research project of the “LATEQS” group [1]

Requirements

- An experimental PhD or postdoc in the field of superconducting circuit
- Skills in cryogenics and high frequency measurements
- Fabricated superconducting circuits in a cleanroom

Bonus if you have

- A strong background in Python
- Knowledge of the theory of superconducting circuits
- Strong team spirit

Environment:

Our research group, hosted at CEA Grenoble, is part of the French national “Plan Quantique” and closely collaborates with in-house theory colleagues. The lab is located on a big scientific campus gathering not only CEA with its strong microelectronics research (300 mm clean room) but also other major scientific institutions such as CNRS (Institut Néel), ERSF (synchrotron), ILL (neutron source) and many high-tech companies as well as the University Grenoble Alpes. Grenoble is a vibrant city offering many cultural activities, lovely bars and delicious restaurants. Located in the heart of the Alps it is the paradise for all outdoor enthusiasts.

The team itself hosts ~10 researchers supervising ~10 students and a few postdocs.

Benefits

- Expected yearly gross salary: 40,800€ to 46,800€ depending of experience
  (Median French gross salary ~30,000€)
- 25 vacation days (French law) + 24 RTT (flexible time off)
- Half of transportation cost coverage (French law)
- Contribution to sports, artistic & cultural activities

How to apply

Application with a short statement of your research interest and how it relates to this project, including CV, publication list and preferentially two reference letters should be sent to: etienne.dumur@cea.fr

[1] LATEQS: https://www.lateqs.fr/
[2] PTA: http://pta-grenoble.com/fr/
[3] C. Yu, *et. al*, Nat. Nanotechnol., 18, 741-756 (2023)

Offer #2024-07856

Post-Doctoral Research Visit F/M Postdoctoral position in Quantum Information Theory

Contract type : Fixed-term contract

Renewable contract : Yes

Level of qualifications required : PhD or equivalent

Fonction : Post-Doctoral Research Visit

About the research centre or Inria department

The Inria Saclay-Île-de-France Research Centre was established in 2008. It has developed as part of the Saclay site in partnership with **Paris-Saclay University** and with the **Institut Polytechnique de Paris** .

The centre has **40 project teams** , 32 of which operate jointly with Paris-Saclay University and the Institut Polytechnique de Paris; Its activities occupy over 600 people, scientists and research and innovation support staff, including 44 different nationalities.

Assignment

The research project will explore quantum protocols based on the concept of quantum nonlocality and quantum networks (see arXiv:2104.10700). A non-exhaustive list of potential projects is:

- Methods for characterizing quantum correlations beyond the Bell scenario:
  - mathematical foundation of these methods (C* algebras, noncommutative polynomial optimization): see e.g. arXiv:2210.09065, arXiv:2212.11299, arXiv:2301.12513
  - improve/find new algorithms for characterizing these correlations
  - numerical developpement of these algorithms, see e.g. arXiv:2211.04483
- Understanding the foundational implications of quantum correlations in networks, see e.g. arXiv:2101.10873 and arXiv:2105.09381
- Develop the applications of network nonlocality to certification protocols, such as
  - randomness generation: arXiv:2209.09921
  - self testing of measurements and states: arXiv:1807.04956, arXiv:2201.05032
- Adapt existing protocols for their experimental implementation
- Develop practical benchmarks of the concept of 'Genuine Multipartite Nonlocality' introduced in arXiv:2105.09381
- Develop SDP relaxations for condensed matter problems, see e.g. arXiv:2212.03014, arXiv:2310.05844, arXiv:2311.18707, arXiv:2311.18706
- Explore the limits of quantum distributed computing, see e.g. arXiv:1810.10838, arXiv:0903.113

Any other suggested research project in quantum information theory can be discussed (both from the physics, the computer science or the mathematical viewpoint).

Main activities

The position will be funded through a QuantERA project involving a large european consortium: see the project website https://project.inria.fr/compute/

It will be achieved by collaborating with Marc-Olivier Renou, other members of the group (Xiangling Xu, Lucas Tendick, Isadora Veeren, and also Titouan Carette and Filippo Vicentini), as well as the consortium members:

- Mariami Gachechiladze (TU Darmstadt, Germany) and David Gross (Cologne)
- Victor Magron (LAAS-CNRS, Toulouse, France)
- Igor Klep (University of Ljubljana, Slovenia)
- Antonio Acín (ICFO Barcelona, Spain)

Long stays in the groups of the consortium members will be encouraged.

The starting date is flexible.

Skills

The applicant should hold a PhD degree in computer science, physics, mathematics, or a related field and have an excellent track record of publications in quantum information theory. Familiarity with Bell nonlocality, operator algebras, SDP relaxations of polynomial optimization problems, quantum correlation protocols, experimental physics and / or synchronous distributed computing is a plus.

Benefits package

- Subsidized meals
- Partial reimbursement of public transport costs
- Leave: 7 weeks of annual leave + 10 extra days off due to RTT (statutory reduction in working hours) + possibility of exceptional leave (sick children, moving home, etc.)
- Possibility of teleworking and flexible organization of working hours
- Professional equipment available (videoconferencing, loan of computer equipment, etc.)
- Social, cultural and sports events and activities
- Access to vocational training
- Social security coverage

Remuneration

According to the candidate profil

General Information

- **Town/city :** Palaiseau
- **Inria Center :** Centre Inria de Saclay
- **Starting date :** 2024-10-01
- **Duration of contract :** 2 years
- **Deadline to apply :** 2025-06-30

Contacts

- **Inria Team :** AT-SAC AE
- **Recruiter :**
  Renou Marc-olivier / marc-olivier.renou@inria.fr

About Inria

Inria is the French national research institute dedicated to digital science and technology. It employs 2,600 people. Its 200 agile project teams, generally run jointly with academic partners, include more than 3,500 scientists and engineers working to meet the challenges of digital technology, often at the interface with other disciplines. The Institute also employs numerous talents in over forty different professions. 900 research support staff contribute to the preparation and development of scientific and entrepreneurial projects that have a worldwide impact.

Warning : you must enter your e-mail address in order to save your application to Inria. Applications must be submitted online on the Inria website. Processing of applications sent from other channels is not guaranteed.

Instruction to apply

Defence Security :
This position is likely to be situated in a restricted area (ZRR), as defined in Decree No. 2011-1425 relating to the protection of national scientific and technical potential (PPST).Authorisation to enter an area is granted by the director of the unit, following a favourable Ministerial decision, as defined in the decree of 3 July 2012 relating to the PPST. An unfavourable Ministerial decision in respect of a position situated in a ZRR would result in the cancellation of the appointment.

Recruitment Policy :
As part of its diversity policy, all Inria positions are accessible to people with disabilities.

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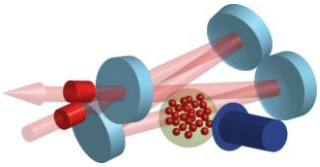
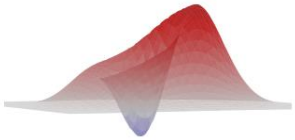
Quantum engineering of light with intracavity Rydberg superatoms



Internship, PhD & Post-Doc offers

Quantum Photonics Team,
Young Physics Teams (JEIP),
Collège de France,
11 place Marcelin Berthelot, 75011 Paris
alexei.ourjoumtsev@college-de-france.fr
https://jeipcdf.cnrs.fr/quantum-photonics/



Optical photons are excellent carriers of quantum information, but their lack of mutual interactions is a major roadblock for quantum technologies. We enable such interactions by transiently injecting the photons into an intra-cavity cold atomic gas and converting them into strongly interacting Rydberg polaritons. The Rydberg-blockaded cloud then acts as an effective two-level superatom with an enhanced coupling to light. We can coherently manipulate its state, efficiently detect it, and observe state-dependent π phase flips on the light reflected from the cavity as required for many quantum engineering tasks [1]. Recently, we obtained the first fully deterministically generated free-propagating states of light with negative Wigner functions [2]. This platform opens many perspectives for developing deterministic multi-photon gates, performing quantum measurements impossible with current techniques, generating non-classical free-propagating resource states, and studying strongly correlated quantum fluids of light.

We recently expanded the capabilities of this platform towards the multi-superatom regime, to perform deterministic multi-photon quantum logic and generate complex Wigner-negative states of light. Post-doc, PhD, and internship positions are open on this project.

We are also looking for a post-doc, a PhD student and interns to assist us in the design and construction of a new setup where single atoms will be trapped and controlled next to a superatom. The industry-connected research project will aim at developing quantum interconnects between static and flying qubits, in a collaboration with the quantum tech company Pasqal.

Both projects require a background in quantum physics, cold atoms and quantum optics, an interest in experimental research and an ability to work in a team.

[1] J. Vaneecloo, S. Garcia & A. Ourjoumtsev, Phys. Rev. X **12**, 021034 (2022)

[2] V. Magro, J. Vaneecloo, S. Garcia & A. Ourjoumtsev, Nature Photonics 17, 688 (2023)

Daniel Comparat

Directeur de Recherche CNRS
Université Paris-Saclay, CNRS, Laboratoire Aimé Cotton,
Bâtiment 505, 91405 ORSAY Cedex
☎ : 06 79 76 86 19,
✉ : Daniel.Comparat@cnrs.fr

Internship/PhD/post doc offer 2024/2025

Laboratory: Aimé Cotton (LAC)
Director: Olivier Dulieu
Address: bâtiment 505, campus d'Orsay, 91405 Orsay
Person in charge of the internship: Daniel COMPARAT
Tel: 06 79 76 86 19
e-mail: daniel.comparat@cnrs.fr

Electron Electric Dipole Moment using Cs in cryogenic matrix

Scientific project: Electron Electric Dipole Moment using Cs in cryogenic matrix

Electric Dipole Moments (EDMs) of electrons, neutrons or nuclei are sensitive probes for new physics beyond the Standard Model of particle physics. In the present project (EDMMA: Electric Dipole Moment with atoms and molecules in Matrix), we propose to measure the electron EDM using embedded particles in a cryogenic solid matrix of rare gas or hydrogen. Matrices offer unprecedented sample sizes while maintaining many characteristics of an atomic physics experiment, such as manipulation by lasers. An EDM experiment on atoms and molecules in inert gas matrices has the potential to reach a statistical sensitivity in the order of 10-36e.cm; a value several orders of magnitude beyond that of any other proposed technique. In a strong collaboration between experimental (LAC, ISMO,LPL) and theoretical (CIMAP) groups, we seek to perform a detailed investigation of all limiting effects (trapping site dependence of optical pumping and coherence times mainly) using metal atoms (Cs typically) in argon and parahydrogen matrices in view of a first proof of principle EDM measurement. This will pave the way toward unprecedented sensitivity. During this work, that can be a Internship PhD or post doc we propose to setup the cryostat with argon and make the first test of RF spin dynamics and hyperfine structure study of cesium embedded in an argon matrix. In the same time collborations with US colleague at Reno undeer an ANR/NSF grant called Quantum sensing in cryocrystals for fundamental physics (QUIC) will start.

Methods and techniques: spectroscopy, cryogeny, laser, RF, fundamental physics

Postdoctoral Researcher in Quantum Thermometry M/W

Context

One of the main current challenges in thermal metrology is to develop practical primary thermometers operational over a wide range of temperatures. The European project JRP PhoQuS-T (Photonic and Quantum Sensors for Practical Integrated Primary Thermometry, https://phoqus-t.com/) aims to develop and validate an innovative primary temperature sensor using quantum technologies. This sensor, based on an optomechanical nanoresonator, consists of a photonic and phononic crystal forming both a mechanical resonator and an optical cavity, coupled through optomechanical interaction. This allows the mechanical (thermal) motion of the resonator to be probed with light. Thermometers based on optomechanical nanoresonators have the potential to overcome the practical complexity of conventional primary thermometers thanks to the possibility of integrating them on a chip and combining the advantages of different techniques (absolute (quantum regime) and relative (classical regime)) to cover a wide range of temperatures.

In this project, work will be carried out in close collaboration between three laboratories with expertise in multiple fields. The fabrication of photonic and phononic crystals will take place in the cleanrooms of the Centre de Nanosciences et de Nanotechnologies C2N (Université Paris-Saclay). The quantum protocol will be developed in collaboration with the Optomechanics and Quantum Measurements team at the Kastler Brossel Laboratory LKB (Sorbonne University), and finally, the LNE-Cnam will develop metrological validation methods for the optomechanical thermometer and ensure traceability to the International Temperature Scale.

Missions

Within the "Temperatures" division of the LNE and with our partners (C2N and LKB), you will contribute to developments in the field of quantum thermometry with the following activities. Based on the initial results obtained during the previous JRP 17FUN05 PhotOQuanT project, new 1D and 2D optomechanical resonators will be developed and tested to reduce the self-heating effect. At the same time, different readout protocols will be improved or developed: photonic thermometry (which explores the frequency shift of optical resonance due to the thermo-optic effect); optomechanical noise thermometry (where the Brownian motion of a mechanical oscillator is probed by optical phase measurement); and quantum correlation thermometry (which uses quantum radiation pressure noise to calibrate the thermal noise of the resonator). Metrological characterization of the developed sensors will be carried out in specially designed low-gradient cryostats equipped with calibrated temperature probes to ensure traceability to existing temperature references.

Your main missions are as follows:

- Participate in the engineering of optomechanical resonators (design, modeling, etc.).
- Contribute to the engineering of optical instrumentation (fibered and free-space optical setup), electronic detection (low-noise detection, spectrum analyzer), and signal processing (FPGA, data transfer for post-processing).
- Supervise the installation of new cryostats (pulse tube, dilution refrigerator) and verify the performance claimed by the supplier.
- Operate and characterize optomechanical resonators over a wide temperature range (1 K - 300 K) and validate their performance as temperature sensors with different techniques: quantum correlation thermometry (below 10 K), optomechanical noise thermometry (1 K - 300 K), and photonic thermometry (50 K - 300 K).
- Ensure reporting actions, particularly to European project partners, and promote results through scientific communications and publications.

Profil

You hold a doctoral degree (Ph.D., Bac+8) in physics and have gained experience in the following fields: optics and photonics, quantum physics, nanofabrication, cryogenics, and signal processing. You have a strong interest in experimental sciences, measurement, instrumentation, and applied and technological research. You possess knowledge of optomechanical systems and demonstrate experience in low-temperature measurements. Experience in data acquisition and processing (Python and LabView, FPGA, rapid data transfer/storage for post-processing) will be highly appreciated. You have analytical and synthesis skills. Pragmatic by nature, you demonstrate rigor, critical thinking, and autonomy. You enjoy teamwork. Proficiency in scientific English is essential for the promotion of your work (writing articles, conferences, meetings) and for collaboration with European project partners. Occasional travel is expected for the scientific exchanges necessary for the mission (project meetings with European partners, international conferences, etc.) in Ile de France, France, Europe, and internationally.

It is a 24 months-contract.

The LCM-LNE/Cnam laboratory is located at St Denis (Ile-de-France).

To apply:

https://www.lne.fr/fr/offre-emploi/postdoctoral-researcher-quantum-thermometry-mw

or contact olga.kozlova@lne.fr for more details.

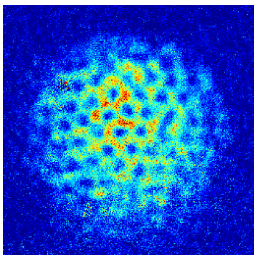
BEC group lead by Hélène Perrin at Laboratoire de physique des lasers — USPN, Paris
https://bec.lpl.univ-paris13.fr/

Post-doc position opening — BEC group @LPL
Vortex turbulence on a curved surface

The Bose-Einstein condensate group at LPL is an expert in the dynamics of quantum gases. We advertize a two-year post-doc position to join our group in Paris North University (USPN) on the Rubidium project, starting in early 2025.

General presentation of the institute: Laboratoire de Physique des Lasers (LPL) is a joint institute of CNRS and Université Sorbonne Paris Nord/USPN located in the North of Paris. It gathers about 80 people on five research axes spanning metrology to biophysics. Electronic, mechanical and optical workshops support our activities. About 20 people currently work in the Quantum gases axis on one of the five experiments, including the Sodium and Rubidium projects.

We operate an original BEC machine enabling the production of two-dimensional ^{87}Rb superfluids trapped onto a curved shell-shaped surface using adiabatic potentials, resulting in a very smooth and highly tunable environment [1]. This enables the study of fast rotating superfluids in a new supersonic regime [2], and the study of vortex lattices [3]. Recently we implemented a protocol to compensate the gravitational potential allowing the superfluid to expand onto the curved surface [4]. We are now in a position to combine these two know-how to study for the first time the physics of a superfluid rotating on a curved surface and address the analogy with atmospheric fluid dynamics.



Vortex lattice produced in the Rb BEC machine at LPL

References

[1] Merloti et al., New Journal of Physics **15**, 033007 (2013)
[2] Guo et al., Phys. Rev. Lett. **124**, 025301 (2020)
[3] Sharma et al., Phys. Rev. Lett. **133**, 143401 (2024)
[4] Guo et al., New Journal of Physics **24**, 093040 (2022)

The hired researcher will drive the following experimental developments and research:

- new imaging systems to improve our current optical resolution. The post-doc will supervise the installation of a new laser system to image the superfluid on the blue (421 nm) 87Rb line and demonstrate in situ vortex imaging, a key asset for the study of vortex turbulence.
- strongly out-of-equilibrium dynamics of a two-dimensional superfluid on a curved surface: the post-doc will contribute to the study of the emergence of turbulent behavior in a rotating frame.

Environment: The postdoc will join the Rubidium team, currently comprising two associate professors and two PhD students (1st year and 3rd year). The experiment is funded by an ongoing ANR project (2023-2026), in close collaboration with the theory group of Sergey Nazarenko (Nice).

Application requirements Applicants should have a PhD in experimental physics. Experience in laser-matter interaction, cold atom physics (laser cooling), lasers and optics would be a major asset, as well as an interest in the physics of quantum gases. Applicants are expected to have excellent teamwork skills.

Position detail: The contract duration is 24 months, starting early 2025, with a gross salary from 3080 € gross monthly depending on experience. Extension is possible.

Contact: helene.perrin@univ-paris13.fr

To apply: https://emploi.cnrs.fr/Offres/CDD/UMR7538-HELPER-005/Default.aspx?Lang=EN

---------- JOB ANNOUNCEMENT ----------

POSITION TITLE

Post-doctoral fellow in integration of quantum communications into networks

TELECOM PARIS

Télécom Paris, a school of the IMT (Institut Mines-Télécom) and a founding member of the Institut Polytechnique de Paris, is one of the top 5 French general engineering schools.

The mainspring of Télécom Paris is to train, imagine and undertake to design digital models, technologies and solutions for a society and economy that respect people and their environment. The school is committed to providing an environment conducive to the development of all students and research professors, and is voluntarily and sustainably committed to an ambitious plan for social and ecological transition. It is working to increase the number of female research professors and to reduce the disparities between men and women.

An inclusive campus on a "human scale" but with a strong international component, Télécom Paris is recognized for its proximity to companies. This public school guarantees excellent employability in all sectors and is the leading engineering school for the entire digital vertical (from hardware layers to uses). With its excellent teaching and innovative pedagogy, Télécom Paris is at the heart of a unique innovation ecosystem, based on interaction and the importance of project mode in its training on the one hand, and its interdisciplinary research on the other. Its teacher-researchers are affiliated with two research laboratories: on the one hand, the LTCI laboratory, which is presented by the HCERES as a flagship unit in the field of digital sciences with remarkable international influence; and on the other hand, the i3 laboratory, Institut interdisciplinaire de l'Innovation (I3 - UMR 9217 of the CNRS), which pursues a multidisciplinary research program focused on innovation in the framework of a collaboration with the École Polytechnique and Mines ParisTech.

Télécom Paris is positioned as an open-air laboratory for all the major technological and societal challenges: artificial intelligence, quantum computing, IOT, cybersecurity, large-scale digital equipment (Cloud), 5G/6G, Green IT.

Based in Palaiseau, at the heart of the Institut Polytechnique campus alongside the École Polytechnique, ENSTA, Télécom Sud Paris and ENSAE, Télécom Paris also has an incubator based in Paris at the heart of the French start-up ecosystem.

SCIENTIFIC CONTEXT

Quantum communications are in high demand, especially the physics-based security guarantee provided by quantum key distribution (QKD). Making it available at scale will require that it be carried over existing optical networks, without having to redeploy new dedicated optical fibers and links. Such coexistence of quantum and classical communications over the same physical medium impacts performance on both sides, with a strong dependence on network-level resource allocation strategies. Novel specific network planning and management tools, using accurate models of the quantum signal in the physical layer, are thus needed to jointly optimize quantum and classical network capacities.

The GTO team of LTCI has long been an internationally-renowned actor of the field of optical communications and networking. In recent years, leveraging its know-how in coherent optical communications, propagation and device physics, and its close association with other teams in LTCI and beyond, it has conducted experimental demonstrations of symbiotic quantum and classical transmissions over optical fiber, as well as simulation studies of network-level performance evaluation

---------- JOB ANNOUNCEMENT ----------

POSITION TITLE
Post-doctoral fellow in integration of quantum communications into networks

of coexisting quantum and classical communications. These activities are supported by the European Quantum Flagship project QSNP, a partnership that includes 42 academic and industrial partners over Europe.

The COMELEC department of Télécom Paris situates its action within the framework of the knowledge triangle which links education, innovation and research. As such, it works in the field of engineering training, continuing education and doctoral training; it also conducts academic research in the field of information technology; finally, it places its application studies and innovative developments in a cooperative approach with industry and emerging companies.

JOB DESCRIPTION

MAIN RESPONSIBILITIES AND DUTIES
1. **To carry out research missions in the field of integration of quantum communications into networks** 2. **To ensure supervision and tutoring missions** 3. **To contribute to the reputation of the School, the Institut Mines-Télécom and the Institut Polytechnique de Paris**

POSITION RESPONSIBILITIES
1. To carry out research missions in the field of integration of quantum communications into networks - Conducts research assignments under departmental contracts in the field of integration of quantum communications into networks - Participates in and ensures the completion of project deliverables **2. To ensure supervision and tutoring missions** - Supervises student projects and engineering internships **3. To contribute to the reputation of the School, the Institut Mines-Télécom and the Institut Polytechnique de Paris** - Publishes the results of its research work - Gives presentations and conferences - Is involved in learned or professional societies - Maintains close relations with academic institutions, research centers and companies **4. Other activities**

---------- JOB ANNOUNCEMENT ----------

POSITION TITLE
Post-doctoral fellow in integration of quantum communications into networks

- Participates in the scientific, pedagogical and management activities of the Department or Institution
- If necessary, directs and manages the agents placed under his/her responsibility or supervision
- Reports on the activities and results of the missions for which he/she is responsible

SKILLS

Required skills, experience, and knowledge:

- In-depth theoretical and practical knowledge in the fields of optical and quantum communications and/or network performance evaluation
- In-depth practical skills in software development for scientific studies
- Fluency in English

Preferred skills, experience, and knowledge:

- Familiarity with experimental lab work
- Familiarity with the Python programming language

Other abilities and skills:

- Ability to work in a team, dialogue and writing skills
- Interpersonal and pedagogical skills
- Ability to synthesize

REQUIRED QUALIFICATIONS

Candidates with the following qualifications may apply:

- PhD or equivalent

---------- JOB ANNOUNCEMENT ----------

POSITION TITLE
Post-doctoral fellow in integration of quantum communications into networks

ADDITIONAL INFORMATION

Date posted: Septembrer 13, 2024

Type of contract: **Post-doctoral fellow**

Duration of the contract: **12 months**

Location: Télécom Paris, 19 Place Marguerite Perey, Palaiseau 91120, France

Department/Unit: COMELEC (Communications and Electronics)

Superior/Supervisor: Van-Tam NGUYEN

Category / job title: II – P

Category / titles agents can apply for: II

APPLICATION INSTRUCTIONS

Applications should be submitted using the following link:
https://institutminestelecom.recruitee.com/o/post-doctorante-ou-post-doctorant-en-integration-des-communications-quantiques-dans-les-reseaux-cdd-12-mois
and include:

- A detailed CV
- A cover letter
- Any element considered useful for the examination of the application

In order to be considered, applications must be received no later than: October 17, 2024

Scientific contact person: Cédric Ware (cedric.ware@telecom-paris.fr)
Administrative contact person: Hamidou Yaya Koné (hamidou.kone@telecom-paris.fr)

Telecom Paris is an equal-opportunity employer.
All our positions are open to individuals with disabilities.