**Post-Doctoral Position in Quantum Communications**

**Description:**

A 2-year post-doc position is available to develop experimental quantum communication protocols, focused on the continuous variables encoding. The duration of the contract can be extended at the candidate’s request, subject to his/her performance results. The candidate will join Telecom Paris, one of the member of the Institute Polytechnique de Paris. We target December 1st 2023 for the starting date, but with some flexibility to start later (until February 2024). The work of the post-doctoral student will be part of the European project QSNP (Quantum Secure Network Partnership) gathering 40 European academical and industrial partners. She/He will be co-supervised by Dr. Nicolas Fabre (GTO, Telecom Paris) and Prof. Romain Alléaume (Quryosity = QTY, Telecom Paris - Inria).

**Context:**

One of the most celebrated achievements in the realm of quantum information processing and communication is the ability to securely distribute secret keys between two parties, irrespective of the capabilities of a potential eavesdropper. Quantum key distribution is a remarkable potential of encoding information using the quantum properties of light, with profound implications for high-security applications. Today, quantum key distribution systems operate successfully in real-world conditions and are commercially accessible. Leveraging continuous variables encoding allows for straightforward implementations that rely on standard telecommunication technology, making it an appealing approach for various applications. To achieve widespread technological advancement, a key hurdle to address revolves around the substantial deployment costs associated with implementing these systems on a large scale.

The candidate will benefit and contribute to the development of the state-of-the-art 40-G coherent optical communication experimental platform for implementing CV-QKD protocols that was developed at Telecom Paris, and will be soon integrated into the Paris Region Quantum Communication Infrastructure. Telecom Paris enjoys a strategic advantage due to its prime location in the Plateau of Saclay, a thriving hub that brings together academia, industry, and innovative start-ups, all actively engaged in cutting-edge quantum technologies. This unique ecosystem fosters a dynamic exchange of knowledge and expertise.

The candidate will have access to numerous exciting projects related to quantum communications, offering opportunities on both experimental and numerical fronts. The candidate will benefit from our expertise in both theoretical quantum optics in the group of Prof. Romain Alléaume (QTY, Telecom Paris - Inria) and Dr. Nicolas FABRE (GTO) and in digital classical communication with Prof.Yves Jaouen (GTO) and Dr. Elie Awwad (GTO).

In order to leverage the existing optical fiber infrastructure to implement such protocols, and to foster the integration of quantum communications, our group has demonstrated a system design allowing to jointly deploy quantum and classical coherent communications over the same fiber, with shared hardware [1]. Noise control procedures, based on careful system design and on Digital Signal Processing (DSP) constitute a central challenge to optimize performances, that the post-doc candidate will continue to tackle.
Another line of research that can be conducted is related to the development of novel coherent detection methods in quantum communication protocols that leverage DSP to alleviate hardware requirements. Our main objective will be to study such a coherent detector to be used as a high-rate and secured quantum random number generator.


Scientific environment:

The post-doctoral student will join the groups of Dr. Nicolas Fabre (GTO, Telecom Paris) and Prof. Romain Alléaume (QTY, Telecom Paris - Inria), in collaboration with leading coherent communication experts Prof. Yves Jaouen and Dr. Elie Awwad (GTO, Telecom Paris). She/he will have the opportunity to work in collaboration with the European consortium QSNP, and with experimental and theory Ph.D. students and post-docs at Telecom Paris.

Experience and qualifications

- Candidates must hold an internationally recognized PhD (or evident to its completion in the nearest future) preferably in optical communication or in quantum optics.
- The candidate should have a proven track record of scientific research in experimental optics.
- Preferred: Programming experience in a standard language (Python, C++, or MATLAB, etc.)
- Prior experience in experimental quantum communication and digital communication is preferable.

Appointment details:

- Full-time fixed-term appointment for a duration of 2 years (with a possibility of extension).
- Monthly stipend: 2200 - 3600 euros/month net, depending on the experience of the candidate.
- Workplace address: Telecom Paris.

Application procedure

- Interested applicants please send your resume to nicolas.fabre@telecom-paris.fr
  Attach your full CV, cover letter, list of publications, and the name of two references.

Application deadline

Applications will be considered upon reception, and no later than the 15th, October 2023.