

Open staff scientist (*Ingénieur de recherche*) position in the Quantic team, ENS Paris

The Quantic team specializes in the design and experimental implementation of quantum error correction protocols for superconducting circuits. The team experimental activities are located in LPENS (ENS Paris) and are conducted by 2 permanent researchers, 2 postdocs and 7 PhD students. They collaborate closely with theoreticians from the Quantic team (located at Inria Paris) and with the start-up Alice & Bob. Recent significant results include the demonstration of exponential suppression of bit-flip errors in the Schrödinger cat code [1,2] and the design and characterization of exotic superconducting circuits for the autonomous protection of quantum information [3].

We will hire a staff scientist (*Ingénieur de recherche*) to assist us with all the technical aspects of our experiments (in particular improving our microfabrication processes and our cryogenic and microwave setups) and to better structure our laboratory which has grown over the past years. Depending on his/her wishes, the recruited person could dedicate a fraction of his/her time to developing his/her own research projects (related to the team activities). He/she will participate in the supervision of the team students.

Responsibilities

1. Development and optimisation of microfabrication processes for superconducting circuits
2. Characterization and improvement of microwave and DC setups (filtering, shielding, thermalization...)
3. Design of sample-holders, on-chip microwave components and other relevant technologies for quantum information processing in superconducting circuits
4. Development and maintenance of the team softwares for measurement, simulation and data analysis.
5. Co-supervision of postdocs, PhD students and interns

Profile and qualifications

The candidate should have advanced knowledge and experience in the following fields

1. Microwave engineering
2. Micro-fabrication (lithography, evaporation and sputtering, etching...)
3. Cryogenics
4. Electromagnetic shielding

5. Coding

A good understanding of superconducting circuit technologies and an experience in an academic or industrial laboratory in the field will be a strong asset. Most importantly, the candidate should have solid scientific, technical, organizational and relational skills to participate in all the projects of the Quantic team.

Contacts

Interested candidates may contact

- Philippe Campagne-Ibarcq (philippe.campagne-ibarcq@phys.ens.fr)
- Zaki Leghtas (zaki.leghtas@phys.ens.fr)

as soon as possible. The application should contain a CV mentioning selected publications if relevant.

References

- [1] Lescanne, Raphaël, et al. "Exponential suppression of bit-flips in a qubit encoded in an oscillator." *Nature Physics* 16.5 (2020): 509-513.
- [2] Réglade, Ulysse, et al. "Quantum control of a cat-qubit with bit-flip times exceeding ten seconds." *arXiv preprint arXiv:2307.06617* (2023).
- [3] Smith, William C., et al. "Magnifying quantum phase fluctuations with Cooper-pair pairing." *Physical Review X* 12.2 (2022): 021002.