

# RobustSuperQ – Job offer

2-year postdoctoral position

## Readout on superconducting qubit

### Job description

In the domain of superconducting qubits, the readout suffers from intrinsic drawbacks and is still far from optimal performance. Recently, in our group, we demonstrated an original high-fidelity quantum measurement (Fig.1) which overcomes the usual limitations [1].

In this project, we will work on the building of a multi-qubit platform for quantum technologies based on this new readout and on our recent achievement on quantum limited amplifiers [2]. To optimize readout you will also study fundamental aspects such as quantum-non-demolition measurement, large readout photon number, quantum trajectories. Within a stimulating environment and in collaboration with a PhD student, you will carry out these quantum experiments at very low temperature in a dedicated equipped fridge.

[1] "Fast high fidelity quantum non-demolition qubit readout via a non-perturbative cross-Kerr coupling", R. Dassonneville, et al, Phys. Rev. X 10, 011045 (2020).

[2] "A photonic crystal Josephson traveling wave parametric amplifier", L. Planat, et al, Phys. Rev. X 10, 021021 (2020).

### Laboratory

Your work will be realized in the "Quantum Electronics Circuits Alps" team of NEEL Institute in Grenoble (<http://neel.cnrs.fr>) which has a strong experience in superconducting quantum circuit modelization, nanofabrication, microwave electronics, cryogenic equipment and superconducting qubit experiments.

### Starting date

Fall 2022 (flexible)

### Job requirements

The candidate must have a PhD in experimental physics and you are highly motivated to work on original experiments in superconducting qubits. A strong experience in at least one of these areas is required: nanofabrication in clean room, microwave electronics, dilution fridge.

### Application

Please send a CV, including references, together with a publication list and a letter of motivation to [olivier.buisson@neel.cnrs.fr](mailto:olivier.buisson@neel.cnrs.fr). Feel free to contact him for more details.

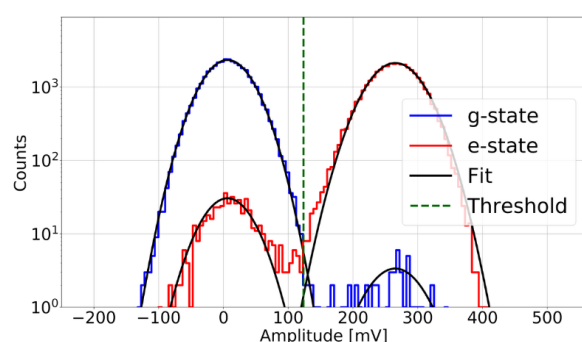
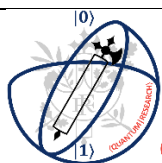
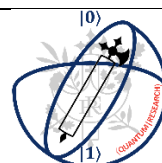


Fig. 1: Histograms on the transmitted microwave amplitude of 150ns single shot qubit readout for qubit prepared in its ground state  $|g\rangle$  (blue points) and excited state  $|e\rangle$  (red points) with heralding. The readout fidelity is 99.4% with a very high 99% quantum-non-demolition.



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<https://www.robustsuperq.fr>

Position : Post-doc

Duration: 2 years

Location: Grenoble <https://neel.cnrs.fr/>

Contact: [olivier.buisson@neel.cnrs.fr](mailto:olivier.buisson@neel.cnrs.fr)