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. Feel free to contact him for more details.

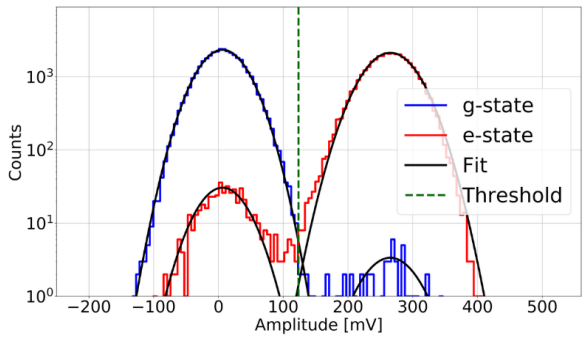

Fig. 1: Histograms on the transmitted microwave amplitude of 150ns single shot qubit readout for qubit prepared in its ground state |g> (blue points) and excited state |e> (red points) with heralding. The readout fidelity is 99.4% with a very high 99% quantum-non-demolition.

PROGRAMME ET EQUIPEMENTS PRIORITAIRES DE RECHERCHE QUANTIQUE

NEEL institut

FRANCE QUANTUM BASIC RESEARCH PROGRAMME

https://www.robustsuperq.fr