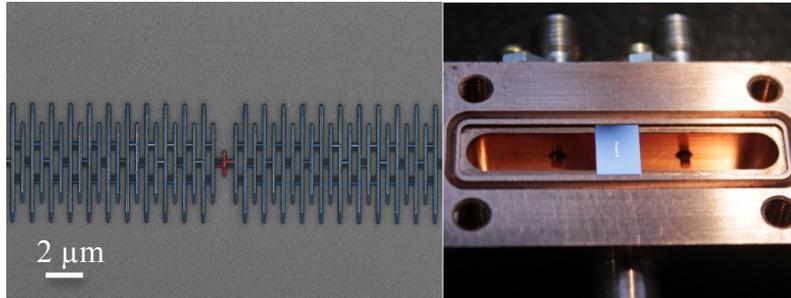


Post-doctoral position : protected superconducting qubits

The superconducting circuits group at Néel Institute in Grenoble offers a postdoctoral position. Over the recent years, our team has specialized in large kinetic inductance superconducting quantum circuits working at milliKelvin temperatures [1] with applications ranging from novel superconducting qubits [2] to state-of-the-art quantum limited amplifiers [3]. Your main task will be to combine superinductances and innovative circuit geometry to build the next generation superconducting qubits with enhanced quantum coherence and intrinsically protected gates.



Left: example of a Josephson meta-material we engineer in our lab. It is made of thousands of Josephson junctions and behaves as a “superinductance”, which is several orders of magnitude larger than what is usually found in standard electronic circuits. Right: superconducting qubit embedding a superinductance (black rectangle) sitting in its copper microwave cavity. In this specific case, the addition of a superinductance enabled a novel readout mechanism.

[1] Observation of quantum many-body effects due to zero point fluctuations in superconducting circuits, S. Leger, et al. *Nature Communications* 10, 5259 (2019). [2] 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). [3] A photonic crystal Josephson traveling wave parametric amplifier, L. Planat, et al. *Phys. Rev. X* 10, 021021 (2020).

Context: This position is funded within the ERC project SuperProtected (SUPERinductance for hardware-PROTECTED superconducting qubits).

Means available: Our team specializes in the coherent control and manipulation of superconducting quantum circuits. You will benefit from a dedicated, state-of-the-art setup combining very low temperatures (around 10 mK), fast electronics and quantum-limited microwave detection chains. The devices are fabricated in the clean room of the Neel Institute (Nanofab), offering state-of-the-art equipment (100 keV e-beam writer, dedicated Plassys evaporator, ALD and PE-CVD machines...).

Required profile: PhD degree with a solid background in quantum physics. A strong experience in at least one of the following areas is required: nano-fabrication, microwave and digital electronics, advanced cryogenic equipment (dilution refrigerators), theory of quantum circuits.

Foreseen start for the position: Fall 2021

Duration: From 24 up to 48 months

Gross Salary: From 2648 €/month to 3768 €/month, depending on the candidate experience

Application and Contact: Your application should include a CV, a publication list and a brief cover letter explaining your motivation. To be sent to Nicolas Roch (nicolas.roch@neel.cnrs.fr)

More information: <http://perso.neel.cnrs.fr/nicolas.roch> and <http://neel.cnrs.fr>

