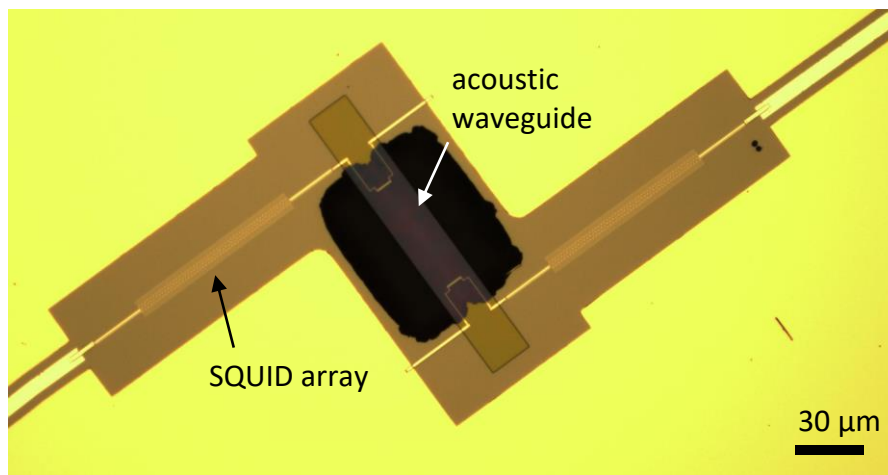


# NÉEL INSTITUTE Grenoble

## Topic for Master 2 internship – Academic year 2023-2024

### Circuit quantum acoustics

**General Scope :** The ability to bring the motion of man-made mechanical systems in the quantum regime is at the origin of a whole research field, with experiments ranging from quantum sensing to quantum information science. Within this field, this project exploits the recently developed circuit quantum acoustics technology, which couples acoustic vibrations with superconducting circuits via the piezoelectric effect. Based on this technology, we aim to provide a novel quantum interface to mechanical oscillators, with perspectives for fundamental investigations and for applied quantum technologies.



**Research topic and facilities available :** The project aims to continue developing our superconducting quantum acoustics technology and to start interfacing nanomechanical oscillators with large zero-point motion and/or 2D materials.

The student will first learn how to design, fabricate and operate acoustic devices at microwave frequencies (several GHz) and cryogenic temperatures (tens of mK). Our devices are based on high-performance materials (such as  $\text{LiNbO}_3$ ) and circuits. The fabrication takes place in the clean room of the Néel institute using state-of-the-art techniques. The cryogenic microwave measurements are performed in a dedicated dilution refrigerator.

**Possible extension as a PhD : Yes**

**Required skills:** We are looking for a motivated student, willing to be part of a project involving both technical and fundamental challenges, and wanting to learn a wide variety of skills in experimental physics.

**Starting date:** Flexible

**Contact:** Jeremie Viennot

Institut Néel - CNRS

Phone: +33 4 76 88 79 05

e-mail: [jeremie.viennot@neel.cnrs.fr](mailto:jeremie.viennot@neel.cnrs.fr)

Web: <https://neel.cnrs.fr/les-chercheurs-et-techniciens/jjviennot>