Design of a coldfinger for qubits and superconducting device measurements

Internship project

General Information

Laboratory: Hybrid Quantum Circuits Laboratory (HQC)
Supervisor: Dr. Simone Frasca
Location: EPFL PH
Starting date: September 2024
Contacts: simone.frasca@epfl.ch

Motivation

When operating superconducting quantum devices, whether they are qubits or else, it is of fundamental importance to pay attention to all sources of noise that can be introduced in the system. Thermal and magnetic noise play a key role in performing proper measurements of superconducting devices.
Much work has been done in the last decades to ensure that qubits, are shielded by these less obvious sources of noise that can cause a loss of coherence time.

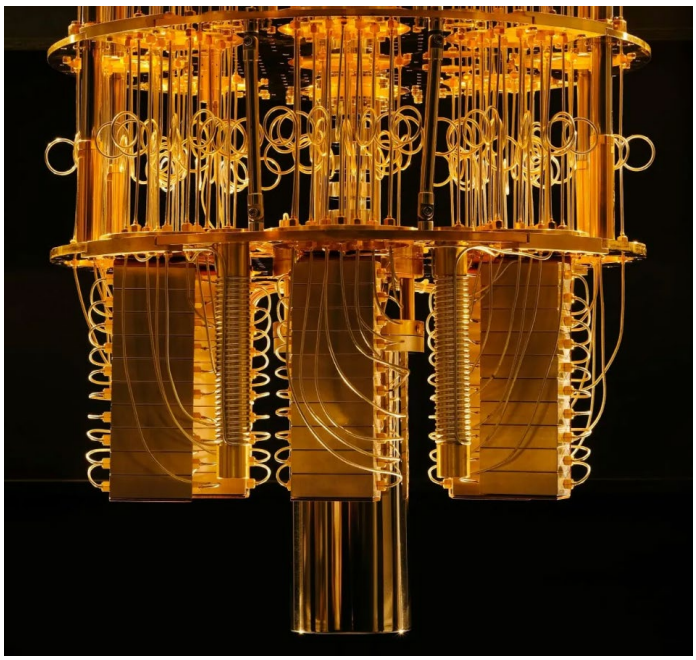

Fig 1 Colfingers in IBM cryostat

Description

The project consists on the design and the test of a coldfinger by means of qubit characterization. The project will consist of two phases:

1. **Design of the coldfinger**. In the first months, the student will design the mechanical parts necessary to assemble a qubit-compatible coldfinger.
2. **Fabrication and testing**. The student will then learn how to perform qubit characterization in the lab by measuring the qubit in the fabricated coldfinger.

Tasks

- Literature search
- Coldfinger design and simulation
- Coldfinger fabrication and assembly via mechanical workshop
- Experimental characterization of the coldfinger by measuring transmon qubits