

RobustSuperQ – Job offer

2 year position

In Graphene based superconducting quantum circuits

Job description

You will work on superconducting quantum circuits with hybrid graphene Josephson junctions. Superconducting quantum circuits are one of the leading platforms for the development of a quantum computer. Traditional approaches that are used by many research groups and companies (IBM, Google...) around the world, rely on the use of tunnel Josephson junctions made with a thin insulating barrier separating two superconducting electrodes. Using this platform, tunability of the system is obtained using magnetic fields. While successful, this has some major drawbacks for interferences between different parts of the circuit and for scaling. We propose to use a different approach by bringing electrical tunability in such circuit. This can be done using a Josephson junction that contains a semiconducting material.

In this project, you will fabricate graphene-based Josephson junctions and integrate them into superconducting quantum circuits to realize quantum bits. You will explore the coherence in such system. The goal will be to probe designs that can offer topological protection of the relaxation and coherence. All the necessary equipment is already available and the team has demonstrated superconducting circuits with graphene Josephson junctions.

In Institut Néel, Grenoble

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

Starting date

Fall 2022 (flexible)

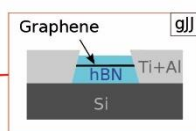
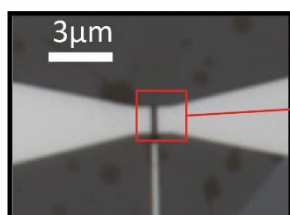
Job requirements

The candidate must hold a PhD in experimental physics. You are expected to be strongly motivated to learn the techniques involved in the project (nanofabrication in clean room, radiofrequency electronics, cryogenics...) and engage in an hands-on experimental work

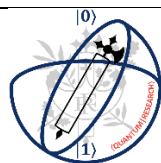
How to apply

Please send your application to julien.renard@neel.cnrs.fr

Required documents: CV, including references, together with a publication list and a letter of motivation.



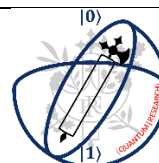
A graphene Josephson junction (gJJ) made in the team. We use hexagonal boron nitride (h-BN) encapsulated graphene and connect it with a superconductor (Ti+Al). The junction shows a voltage-tunable supercurrent thanks to the field effect of graphene.



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