

Internship: Theoretical Design and Simulation of Superconducting Circuits – QuantaSense

Location: Calgary

Employment Type: Internship

About Quantasense

At Quantasense, we're pioneering the transition of quantum sensing from the lab to real-world applications. Our work sits at the intersection of photonics, microwave engineering, and quantum physics, covering the full spectrum—from theoretical modelling and design to fabrication and precision measurement. We push the boundaries of physics to the quantum mechanical limit, enabling unprecedented clarity in data, faster decision-making, and breakthroughs once thought impossible. If you're passionate about applying fundamental physics to solve practical problems and shaping the next generation of sensing technologies, we'd love to hear from you.

Role Overview

As a Theoretical Design and Simulation of Superconducting Circuits Intern, you will play a key role in the development and evaluation of advanced circuit designs. This internship offers hands-on experience across the full design cycle. You will utilize the theoretical foundations of quantum optics and electrical engineering to determine key parameters required for circuit design. You will then use softwares such as Sonnet and HFSS to extract and analyze electromagnetic characteristics of circuits and components. You will create and optimize circuit designs for fabrication using tools such as Klayout, AutoCAD, or similar CAD software, ensuring accuracy and repeatability. You will measure and analyze fabricated circuits to validate performance, extract parameters, and compare results against simulation. This role is ideal for candidates interested in Quantum RF/microwave engineering, circuit design, and practical device characterization.

Key Responsibilities

- Provide theoretical framework and extract the desired characteristics of circuits.
- Use simulation software to analyze and extract characteristics of circuits and components.
- Design and draw circuit layouts for fabrication using tools such as Klayout and AutoCAD.
- Prepare accurate fabrication files and ensure design compliance with manufacturing requirements.
- Measure and characterize fabricated circuits to validate performance and extract device parameters.
- Compare experimental results with simulation data and document findings for design optimization.
- Collaborate with team members for troubleshooting design and operation challenges.

Preferred skills/Interests:

- Currently enrolled in or recently graduated from an Electrical Engineering, Physics, or related program.
- Basic computer skills.
- Familiarity with EM simulation tools (e.g., HFSS, Sonnet) or willingness to learn.
- Experience with circuit layout software (e.g., Klayout, AutoCAD) or willingness to learn.
- Ability to perform measurements using lab equipment such as VNAs, SAs, signal generators, etc. or willingness to learn.
- Strong analytical and problem-solving skills with attention to detail.
- Good communication skills and ability to work collaboratively in a team environment.

Why Quantasense?

- Work at the frontier of quantum sensing technology, taking cutting-edge physics into real-world applications.
- Be part of a team where your contributions directly shape products and processes.
- Hands-on experience across design, fabrication, and measurement of devices in a collaborative environment.
- Opportunity to tackle challenging problems in photonics, microwave engineering, and quantum-limited sensors.
- Join a company committed to innovation and pushing the boundaries of what's possible in sensing technology.

Think the role is right for you? **Email a resume and a cover letter to hiring@quantasense.ca**