Arphioniq

STUDENT OPPORTUNITY
Internship · MSc Thesis · BSc Project

Microwave-optical transfer cavity

Building a novel laser frequency stabilization solution for neutral-atom qubit control

FORMAT *In-person*	**DURATION** *3–6 months*	**LOCATION** *Science Park Amsterdam (HoQ)*
LEVEL *MSc*	**DISCIPLINE** *Physics · Mechanics · Optics*	**START** *Flexible*

ABOUT ARPHIONIQ

Arphioniq is a photonics deep-tech spin-out of the University of Amsterdam, building scalable and field-deployable frequency-stabilised laser infrastructure — the enabling layer that lets photonic-based quantum computing and sensing systems move out of the lab and into the real world. Along with frequency stabilization, our patented platform also powers precision positional measurement for advanced manufacturing. You'd work directly alongside the founding team, contributing hands-on to the journey of transforming an innovative technology into a deep-tech product.

THE PROJECT

Quantum technologies are poised to transform many modern computing and sensing applications. Optically addressable modalities, such as neutral atoms, have shown a great potential but require specialized frequency-stabilized laser infrastructure, which remains one of the key bottlenecks for their large-scale deployment.

Arphioniq builds a novel laser frequency-stabilization solution based on a proprietary microwave-optical transfer interferometric platform. One of the core components of the solution is a microwave-optical transfer cavity (MOTC), an opto-mechanical resonator that facilitates stabilization of the laser. To provide the required performance, the MOTC needs to meet stringent requirements in terms of its optical quality, mechanical robustness and thermal stability. In this project, you will work on designing, prototyping and characterizing the MOTC, as one of the core building blocks of Arphioniq's frequency stabilization system.

In the initial phase of the project, you will get to analyse input requirements and use theoretical analyses and/or numerical modelling tools to propose and optimise the cavity design. This will include aspects of material selection, mechanical and optical design, vibrational and thermal analysis. In the second phase, you'll procure relevant parts and components, and assemble the prototype based on your design, giving you a hands-on opportunity to experience and understand the impact of your design choices on the manufacturability of the system. In the final phase, you will perform a basic characterization of the MOTC prototype with regard to its optical, mechanical and thermal performance, validating your design specifications, and producing a report covering the performance achieved and suggestions for future improvements.

WHAT YOU'LL BRING

- Enrolled in an MSc in physics, optics, (opto)mechanical engineering or similar
- Relevant background in mechanics & mechanical (CAD) design. Experience with optics is a plus
- Hands-on with a "can-do" mentality, rigorous with data
- Fluent working English
- Able to work independently and in a small team

WHAT WE OFFER

- Real ownership of a problem contributing to an innovative project with real-world application
- Hands-on experience in the field of photonics and quantum technologies
- Close mentorship from founding team experts
- A seat in a fast-moving startup at Science Park Amsterdam
- Monthly stipend to compensate you for your effort

HOW TO APPLY

Send a short CV and a few lines on why this project fits you to **info@arphioniq.com**. Questions? Don't hesitate to reach out at the same address. Applications are reviewed on a rolling basis.