Arphioniq

STUDENT OPPORTUNITY
Internship · MSc Thesis · BSc Project

From Bench to Chip: RFSoC - Based RF system

Design and characterise a digital RF subsystem to replace discrete bench-top instruments with a single System-on-Chip

FORMAT *In-person*	**DURATION** *6-9 months*	**LOCATION** *Science Park Amsterdam (HoQ)*
LEVEL *MSc*	**DISCIPLINE** *Electrical Engineering · Physics*	**START** *Flexible*

ABOUT ARPHIONIQ

Arphioniq is a photonics deep-tech spin-out of the University of Amsterdam. We build scalable and field-deployable frequency-stabilised laser infrastructure — the enabling layer that lets quantum computing and sensing systems move out of the lab and into the real world. The same patented platform also powers precision measurement for advanced manufacturing. You'd work directly alongside the founding team, contributing hands-on to the journey of transforming hard-tech technology concept into a 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. The platform processes radio-frequency (RF) signals at frequencies up to several GHz to perform laser stabilization. Today our RF signal chain lives on discrete bench-top instruments: synthesisers, spectrum analysers, analogue lock-in amplifiers, and PID controllers. Collapsing the entire chain onto a single Radio Frequency System-on-Chip (RFSoC) is a critical step toward a compact, field-deployable product and that is the challenge you will own. You will design, bring up, and characterise an RFSoC-based RF subsystem capable of both synthesising and acquiring signals up to 6 GHz.

You will start with an existing benchtop system and commercial RFSoC module to measure and establish performance benchmarks (phase noise, lock stability, acquisition time, noise) for the RFSoC module. At this stage, you'll get to configure the high-speed DACs and ADCs, develop FPGA gateware, and implement a digital lock-in amplifier for low-noise error-signal extraction on the RFSoC module. At the later stage, you will support the development and implementation of custom functional modules in the FPGA layer and its user interface, such a RF signal generators, phase and frequency meters and PID loops on the RFSoC and assess its performance against the established baseline. Depending on progress, you may extend the work to multi -channel locking or adaptive loop-filter tuning. You will finish the project by writing an report covering the performance achieved and suggestions for further improvements.

WHAT YOU'LL BRING

- Enrolled in an MSc in electrical engineering, physics or similar
- Relevant background in electronics. Prior experience with control electronics and measurement automation.
- 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.