Job description

The industrial doctorate at Infineon: Pursue a doctoral degree at a university and gain professional experience simultaneously - an ideal start for your career. Advance your research with us and profit from our vast network of doctoral candidates and the expertise of a university. Mentorship is handled by both professors and dedicated Infineon experts.

We are offering a doctoral thesis in the field of trapped-ion quantum computing. You will be building on the success of the 2x9 qubit ion trap prototype fabricated at Infineon’s cleanroom facilities in Villach. The focus of your thesis will lie on two key aspects for scaling towards larger qubit numbers: architectural progress and manufacturability. In order to gain system understanding for trapped-ion quantum computing, you will be trained and conduct experiments at the world-leading quantum optics laboratory at the University of Innsbruck. The results of your thesis will accelerate the industrialization of trapped-ion quantum computing.

The thesis will be written in cooperation with the University of Innsbruck and under the supervision of professor Rainer Blatt.

The tasks within the thesis will consist of:

- **Understanding the main fields of improvement of trapped-ion quantum computing**, with emphasis on the aspects of architectural progress (confinement, scaling, shuttling) and anomalous motional heating (decoherence of the motional state)
- **Fabricating ion traps with optimized layouts and material properties** in order to improve on the aspects of architecture and anomalous motional heating
- **Supporting the quality and reliability of Infineon ion traps** by defining control concepts for inline process control, device screening and component verification
- **Performing quantum optics experiments** to demonstrate quantum computing operations with trapped ions

The learnings out of the thesis will be/lead to:

- **Reliable ion traps for trapped-ion quantum computing**
- **Longer motional state coherence times**, enabling longer multi-qubit algorithms

Start: 01.06.2020 (or later)
Full-time employment: 38.5 hrs/week
Duration: 3 years

Profile

A doctoral student is a research enthusiast,

- whose interests are scientific research combined with the passion for Infineon’s innovative products and applications
- who enjoys working in an industrial environment in combination with an Infineon partner university
who appreciates open communication and the contribution of an international environment
and is thus an excellent candidate for a further academic or industrial career after completion of their thesis

As the ideal candidate, you:

- are **highly motivated** individual who wants **quantum computing** to become a reality
- have a **Master's degree in physics**
- have gained first **experience in quantum optics**, ideally in the field of trapped-ion research
- are fluent in **English and German**
- **trust and respect others & team up to drive value through innovation**
- **work experience in an industrial environment** or background in semiconductor manufacturing is an additional plus

Please attach the following documents to your application:

- Your CV
- Motivation letter
- Copy of your master degree certificate if already available
- Otherwise: copy of your latest study transcript

This position is subject to the collective agreement for workers and employees in the electrical and electronics industry. The salary for this position is EUR 2.760,00 gross p.m. (full-time basis).