

Research Scientist Quantum Algorithms

Location: Cologne, Germany / on-site, remote partially possible Role: Research scientist

Department: Applied Fault Tolerance team Employment type: Full-time

Who we are

At neQxt, we build full-stack ion-trap quantum computers, striving for excellent performance and scalability. With decades of expertise in ion-trap technology, neQxt was spun out of Mainz University, and it is headquartered in Germany's Frankfurt Metropolitan area. Our team of leading talent from Europe and beyond covers the entire value chain, from the basic hardware to end-user software level. Join our passionate team of ambitious scientists, engineers, technicians and quantum enthusiasts, building top-tier fault-tolerant quantum computers together!

Job description

You will join neQxt's QEC team in Cologne, Germany. In this role, you are conducting research at the interface of Quantum Algorithms and Quantum Error Correction. In close collaboration with other team members, your tasks include developing resource-efficient integration of QEC methods into the compilation of quantum algorithms on encoded logical qubits to physical operations. This includes a thorough understanding of circuit-level noise and logical gadgets across the QEC pipeline, from state preparation over QEC cycles and logical gates to decoding.

Responsibilities

- Conduct research on quantum algorithms, with a focus on the integration of quantum error correction
- Contribute to the development of models, tools, and numerical methods for the analysis of large-scale, error-corrected algorithms
- Work closely with other researchers to integrate results into broader architectural and simulation frameworks
- Produce high-quality research outcomes, incl. publications, software tools, and technical reports
- Track and incorporate relevant advances in fault-tolerant quantum computing into ongoing work

Requirements

- Education: A PhD in Physics, Mathematics, Computer Science or similar is required.
- Specializations: Expertise in either Fault-Tolerant Quantum Algorithms or Fault-Tolerant Quantum Error Correction, which may include logical-level circuit design, resource estimation, or gate synthesis
- Experience: At least two years of experience in a relevant research project in an academic or industrial setting

Nice to have

- Experience in analytical and numerical methods for analyzing fault-tolerant systems at scale
- Previous project experience at the interface of different layers in the QC stack
- Software development for simulation and benchmarking of quantum computing architectures
- Strong publication record and demonstrated ability to take technical leadership in research teams

Who you are

- You like the idea of working in a fast-paced field, at the forefront of technological development
- Interest in working across and integrating results between different layers of the QC stack
- You can manage complex and demanding technical challenges independently and are not afraid to ask for help
- Curious, persistent and pragmatic, with attention to detail
- You are a proactive problem-solver and are comfortable with posing new research questions
- You are a clear communicator and a collaborative team player

What we offer

Our QEC team is situated in the midst of a thriving research community comprising excellent academic groups in Aachen, Bonn, Jülich, Düsseldorf, Cologne, as well as industrial players like Microsoft and IBM. Cologne is a one-million-people city that is famous for embracing diversity and for its vibrant international scene, which make it particularly attractive for people who don't speak German. The QEC team is currently composed of 50% international and 50% female researchers. We value your individuality and offer a flexible environment.

- Results-oriented environment with flat hierarchies and a passionate team
- Attractive salary with automatic inflation adjustment
- Flexible working hours and full overtime compensation
- Career development in an emerging tech field
- German language courses, if needed
- Company pension scheme
- Choice of a flexible mobility budget or company car
- Default (mandatory) German employment benefits (e.g. health / pension / unemployment insurance, paid sick leave, maternity protection, parental leave, ...)

How to apply

Please submit your CV, a cover letter including your preferred starting date, and any relevant publications, project details or other supporting documents via e-mail to: career@neqxt.org. Applications will be reviewed on a rolling basis until positions are filled. We know that strong candidates often don't tick every box. If the role excites you and you meet the core requirements, we'd appreciate to hear from you rather than not. Please reach out to Sascha Heußen via s.heussen@neqxt.org if you have any questions before applying.