

## Postdoc and PhD positions in Theoretical Quantum Technology at RWTH Aachen University and Forschungszentrum Jülich

We seek excellent, highly motivated and independent **postdoctoral researchers** and **PhD students** to join our theoretical quantum technology research group led by Prof. Markus Müller. Our group recently relocated to the [Institute for Quantum Information](https://www.quantuminfo.physik.rwth-aachen.de/mueller-group/) at RWTH Aachen University and the [Peter-Grünberg-Institute for Theoretical Nanotechnology](http://markus-mueller.website/) at the Forschungszentrum Jülich in Germany.

Our group forms part of a growing highly dynamical research environment with focus on fundamental and practical quantum information science, with the overarching goal of contributing to the realization of large-scale quantum processors. Activities in this direction include participation in the EU Quantum Technology Flagship initiatives [OpenSuperQ](#) and [AQTION](#), the Jülich-Aachen Research Alliance ([JARA](#)), quantum information research at [PGI-2](#), [PGI-8](#) and [PGI-11](#), and the Cluster of Excellence ‘Matter and Light for Quantum Computing’ ([ML4Q](#)) involving the universities of Cologne, Aachen, Bonn and Forschungszentrum Jülich.

The successful candidates will have the opportunity to contribute to one of the following research projects:

- ERC Starting Grant “Open Quantum Neural Networks: From Fundamental Concepts to Implementations with Atoms and Photons”
- EU Quantum Technology Flagship collaboration “Advanced quantum computing with trapped ions (AQTION)”
- International research collaborations “Encoded Qubit Alive (eQual)” and “Certified Topological Quantum Computation (CETO)”

Research topics include, but are not limited to:

- The theoretical development of realistic implementation schemes for quantum error correction and fault-tolerant quantum information processing in state-of-the-art noisy intermediate-scale quantum (NISQ) devices, with a focus on AMO systems as e.g. trapped ions or cold Rydberg atoms and ions;
- The development of new methods to efficiently characterise quantum devices and phases, including experimental quantum error correcting codes, logical qubits and operations on them;
- The exploration of intriguing connections of topological quantum error correction with classical spin models and topological phases in condensed matter;
- Classical machine learning for applications in quantum computing and quantum error correction, as well as quantum machine learning.

More information on our group and main current research lines can be found here

<https://www.quantuminfo.physik.rwth-aachen.de/mueller-group/>

and here:

<http://markus-mueller.website/>

### Requirements for Postdoc applicants

We are looking for candidates who meet the following requirements:

- PhD in physics, computer science or a closely related field;
- A strong background and research experience in one or several of the following areas: quantum information and quantum error correction, quantum optics, atomic physics, topological quantum computation, statistical physics, computer science;
- Experience in programming;
- Experience in (co-)supervising students (desirable);
- Highly motivated and enthusiastic;

- Good communication skills, able to work in a team and to collaborate with PhD and master students on related topics;
- Fluent in spoken and written English;
- Proven record and proficiency in writing research publications.

### **Requirements for PhD applicants**

We are looking for candidates who meet the following requirements:

- MSc or equivalent degree in physics, computer science or a related field;
- Background in quantum computing, particularly in quantum error correction desirable;
- Experience in programming;
- Highly motivated and enthusiastic;
- Good communication skills and able to work in a team;
- Fluent in spoken and written English.

### **Information and Application:**

For more information about these positions please contact Prof. Markus Müller at [m.mueller@physik.rwth-aachen.de](mailto:m.mueller@physik.rwth-aachen.de)

To apply, please email your letter of application, explaining your motivation, research experience and interests, together with your CV and contact details of two referees to Prof. Müller. Applications will be processed on a rolling basis and the positions will remain open until suitable candidates have been identified.

The salary of the PhD (postdoc) positions will be according to 75% (100%) of the E13 salary scale (NRW), varying on the relevant experience of applicants, and with a starting date as soon as possible. The postdoc contracts are fixed-term positions for up to three years.

We promote equal opportunities and diversity in employment relations. Our group particularly welcomes applications from women and applicants with diverse backgrounds.