



Conducting research for a changing society: This is what drives us at Forschungszentrum Jülich. As a member of the Helmholtz Association, we aim to tackle the grand societal challenges of our time and conduct research into the possibilities of a digitized society, a climate-friendly energy system, and a resource-efficient economy. Work together with around 7,500 employees in one of Europe's biggest research centres and help us to shape change!

The mission of the Institute for Quantum Computing Analytics (PGI-12) is to model and improve quantum computing systems on multiple levels. From optimal control of the hardware, over error mitigation and compilation, to application specific quantum algorithms. We focus working on interfaces between disciplines in large innovative projects that strive for the development of scalable and useful quantum computers. In a tight integration with quantum computer hardware developers, we investigate the applicability of quantum computers towards real-world applications in a hardware-software co-design paradigm.

We are offering a

PhD Position - Applied Quantum Information Theory: Error-Aware Quantum Circuits

Your Job:

Your PhD project will be part of an interdisciplinary research project bridging theoretical physics and theoretical computer science. In the course of this, you will work on

- extending established techniques for quantum circuit representation and manipulation (e.g. diagrammatic methods like ZX-calculus) towards description of quantum noise
- employ such extended methods for quantum circuit compilation, optimization and error mitigation
- collaborate with theoretical computer scientists on developing noise-aware quantum programming paradigms

Your Profile:

- Master in physics, computer science or comparable fields
- Good knowledge of quantum theory, ideally quantum information theory
- Organizational and communication skills
- Ability to work independently in interdisciplinary teams

We look forward to receiving your application until 05.10.2025 via our **Online-Recruitment-System!**

Questions about the vacancy?

Get in touch with us by using **our contact form.**

Please note that for technical reasons we cannot accept applications via email.
www.fz-juelich.de

- Good written and spoken English language skills
- Ideally good German language skills, both written and spoken
- Preferably experience in software development

Our Offer:

We work on the very latest issues that impact our society and are offering you the chance to actively help in shaping the change! We support you in your work with:

- **HEALTH & WELL-BEING:** Your health is important to us. You can look forward to a comprehensive company health management programme with a wide range of options, including a beach volleyball court, running groups, yoga classes and much more. In addition, our company medical service and an experienced social counselling team are available to assist you on site
- **WORK-LIFE BALANCE:** Flexible working arrangements (including remote working) are generally possible upon agreement and in line with upcoming tasks and (on-site) appointments
- **CAMPUS EXPERIENCE:** Our research campus in the countryside provides ideal conditions for collegial exchange and sporting activities right on site
- **SUPPORT FOR INTERNATIONAL EMPLOYEES:** Our International Advisory Service makes it easier for international employees to get started
- **FAIR REMUNERATION:** Depending on your qualifications and assigned responsibilities, you will be classified according to pay group 13 (up to 75%) of the TVöD-Bund. Additionally, you will receive a special payment ("Christmas bonus") amounting to 60% of one month's salary. Additional compensation beyond the base salary may be possible. All information about the TVöD-Bund collective agreement can be found on the BMI website: <https://go.fzj.de/bmi.tvloed> (pay scale table on page 66 of the PDF download).
- **LEAVE:** You will receive 30 days of leave plus additional days off (e.g. between Christmas and New Year's Day)
- **KNOWLEDGE & DEVELOPMENT:** Your professional growth is important to us – we support you specifically and individually, for example through training opportunities and the structured JuDocS program for doctoral candidates: <https://www.fz-juelich.de/en/judocs>

In addition to exciting tasks and a collaborative working atmosphere at Jülich, we have a lot more to offer: <https://go.fzj.de/benefits>

We welcome applications from people with diverse backgrounds, e.g. in terms of age, gender, disability, sexual orientation / identity, and social, ethnic and religious origin. A diverse and inclusive working environment with equal opportunities in which everyone can realize their potential is important to us.

Further information on diversity and equal opportunities: <https://go.fzj.de/equality>