



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 Peter Grünberg Institute - Quantum Control (PGI-8) at the Forschungszentrum Jülich specializes in novel optimization strategies for emerging quantum technologies. These emerging technologies aim to provide transformative changes to our society, including how we think about information, and unlocking vast calculations for the natural sciences, logistical problem solving, and high-performance computation. Our group has pioneered the application of quantum optimal control methods to quantum computation and many-body quantum systems. This includes the development of physical models and model reduction techniques as well as algorithmic advances of in-situ optimization and machine learning to tackle the complex processes inherent to scalable quantum devices. You may consult the works by Prof. Dr. Felix Motzoi <https://scholar.google.com/citations?hl=en&user=7xRpOKQAAAAJ> Prof. Dr. Tommaso Calarco <https://scholar.google.com/citations?user=Xb0VoHgAAAAJ&hl=en&oi=ao> and Dr. Francisco Cárdenas-López <https://scholar.google.com/citations?user=GIULPmoAAAAJ&hl=de&oi=sra> for an impression of relevant research.

The Peter Grünberg Institute for Quantum Control (PGI-8) is looking for a

## Postdoctoral researcher - Full-stack quantum control in solid-state quantum computers

### Your Job:

- Develop techniques to simulate, control, and optimize the time-dependent dynamics for increasing system complexities
- Implement and optimize small quantum circuits on super- and semi- conducting processors with respect to practical short-depth (NISQ) quantum algorithms
- Cooperate and actively work with experimental partners developing quantum processors using these technological platforms
- Design and implement optimization techniques for full-stack improvement of

The job will be advertised until the position has been successfully filled. You should therefore submit your application as soon as possible. We look forward to receiving your application 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](http://www.fz-juelich.de)

quantum algorithms

- Model major sources of experimental error for control theory or for error mitigation techniques
- Scientific guidance and support for employees, doctoral candidates and students

#### **Your Profile:**

- Master's degree with subsequent PhD in theoretical physics or a similar field
- Background and strong interest in developing theoretical models and methods as well as in implementing numerical optimization techniques
- Interest in working closely with experimentalists
- Detailed knowledge of quantum physics and experience with quantum technology
- Strong mathematical education, in particular in relation to linear algebra
- Strong programming experience
- Ability to effectively communicate in written and spoken English
- Ability to work autonomously, developing your own ideas, and in close interaction within a team, co-supervising younger colleagues
- Most importantly: enthusiasm to explore uncharted territory, develop, and follow your own ideas

#### **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:

- A highly motivated research group as part of an international and interdisciplinary working environment with access to outstanding computing facilities and connections to the best research institutions around the world
- Opportunity to conduct research at the interface of theory and experiment in a world-leading group in quantum control
- Continuous scientific mentoring by your scientific advisor as well as feedback and wide-ranging expertise from the whole group in multiple facets of quantum technology and optimization
- Direct contact with research project writing, reviewing and management process
- Opportunity to participate in international conferences and project meetings
- A training and a networking in quantum technologies, a field which currently faces (for the next decade at least) significant investment from private and governmental funding agencies
- Flexible working hours in a full-time position (39 hours/week) with the option of slightly reduced working hours - <https://go.fzj.de/near-full-time>
- Flexible work (location) arrangements, e.g. remote work in accordance to the tasks
- 30 days of annual leave and provision for days off between public holidays and weekends (e.g. between Christmas and New Year)

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

The position is for a fixed term of 2 years, with possible longer-term prospects. Salary and social benefits will conform to the provisions of the Collective Agreement for the Public Service (TVöD-Bund), pay group EG 13, depending on the applicant's qualifications and the precise nature of the tasks assigned to them. All information about the Collective Agreement for the Public Service (TVöD-Bund) can be found on the BMI website: <https://go.fzj.de/bmi.tvod> The monthly salaries in euro can be found here: <https://go.fzj.de/bmi.tvod.entgelt>

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>