The Peter Grünberg Institute for 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. Are you looking for a new challenge? Our team is looking forward to receiving your application!

We are looking to recruit a

**PhD position – Quantum Control Theory for scalable semiconductor Quantum Computing architectures**

**Your Job:**

- Develop techniques to simulate and control the dynamics for increasing system complexities
- Implement and optimize quantum operations and routings on a scalable shuttling semiconducting architecture with respect to practical circuit compilation
- Cooperate and actively work with experimental partners developing quantum processors using this technological platform
- Design and implement advanced optimization techniques for direct in-situ use in quantum dot experiments
- Model and characterize major sources of environmental and coherent error stemming from material properties and spin-charge dynamics

**Your Profile:**

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)
• Master degree in physics (or in a related subject)
• 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 and in close interaction within a team
• 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 offer ideal conditions for you to complete your doctoral degree:
• Opportunity to conduct research at the interface of theory and experiment in a world-leading group in quantum control
• Work in 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
• 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
• Opportunity of participating in (international) conferences and project meetings
• Participation in overarching seminars including certificate
• The skills that you will acquire during your Ph.D. are in high demand both in academia and in high-tech companies: at present, there is significant government and private investment in the field of quantum technologies
• Opportunity to develop your strengths, e.g. through a comprehensive training programme; a structured programme including continuing professional development and networking opportunities specifically designed for Jülich’s doctoral researchers by the Jülich Center for Doctoral Researchers and Supervisors (JuDocS): https://go.fzj.de/JuDocs
• 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 the collaborative working atmosphere at Jülich, we have a lot more to offer: https://www.fz-juelich.de/en/careers/julich-as-an-employer/benefits

The position is for a fixed term of 3 years. The salary is in line with pay group 13 (75 %) of the Collective Agreement for the Public Service (TVöD-Bund). In addition, an annual special payment is granted ("Christmas payment"), which amounts to 60 % of the monthly salary. Further information on doctoral degrees at Forschungszentrum Jülich (including its various branch offices) is available at https://www.fz-juelich.de/en/careers/phd

We particularly welcome applications from people from a diverse range of backgrounds (e.g. regardless of age, gender, disabilities, sexual orientation/identity, as well as social, ethnic, and religious background). We strive to offer a diverse and inclusive working environment in which people enjoy equal opportunities and are able to fulfill their potential.