As a member of the Helmholtz Association, Forschungszentrum Jülich makes an effective contribution to solving major challenges facing society in the fields of information, energy, and bioeconomy. It focuses on varied tasks in the area of research management and utilizes large, often unique, scientific infrastructure. Come and work with around 6,100 colleagues across a range of topics and disciplines at one of Europe’s largest research centres.

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

Questions about the vacancy? Contact us by mentioning the reference number 2019-236: career@fz-juelich.de

We cannot accept applications via email.

www.fz-juelich.de

The Institute Peter Grünberg Institute - Semiconductor Nanoelectronics (PGI-9) investigates fundamental problems in semiconductor physics and in semiconductor materials. In the device development alternative concepts and property limits are explored, e.g. the maximum transistor frequency and the minimum transistor cross section. The epitaxy of SiGe, classical III/V compounds and of GaN is a broad activity.

Electronic and optical properties of the grown layers are measured. Nanowire structures are investigated to study the quantum mechanical limit in the nanoelectronic devices. Si/SiGe nanostructures are examined to find promising pathways to drive current CMOS technology to its limits. Templated selfassembly of semiconductor nanostructures in 2- and 3-dimensional arrays and quantum dot crystals is investigated to explore the feasibility of this new materials for future information technology.

We are looking to recruit a

2019-236 - Postdoc in the field of nanofabrication and quantum optics

Your Job:
The development of modern semiconductor devices, which allow assessment and manipulation of their quantum features, represent a key component towards the realization of scalable quantum networks for secure communication. A central aspect of research in this field is the development of semiconductor based single photon sources providing photons as „flying qubits“ and optically/electrically controlled electron spin qubits featuring „stationary“ quantum memories. Finally, optical connectivity between distant ensembles of stationary qubits has to be established by the exchange of flying qubits. For this purpose advanced optical interfaces between single photon sources and stationary spin qubits need to be designed that guarantee efficient coherent quantum state transfer among them with high success fidelity.
In this context, your tasks essentially comprise the following:

• Molecular beam epitaxy of II/VI semiconductor heterostructures
• Nanofabrication of single photon sources and spin qubits
• Design, theoretical simulation and fabrication of microcavities for the enhancement of the quantum efficiency
• Photoluminescence spectroscopy at room temperature and cryogenic temperature
• Quantum optical correlation measurements and statistical data analysis
• Participation in the development of single photon downconversion schemes to the telecommunication band
• Exploration of new concepts towards the realization of an optical interface between single photon sources and electrical spin qubits

Your Profile:

• University degree and subsequent PhD in Physics or Engineering Sciences with background on optical spectroscopy and semiconductor physics
• Comprehensive knowledge in semiconductor and solid-state physics
• Background in optical spectroscopy, quantum optics or nanofabrication technology
• Skills in construction and improvement of optical spectroscopic setups
• Fundamental knowledge in magneto-optics and nanotechnology
• Good communication and organizational skills are essential
• Good written and spoken English language

Our Offer:

• Excellent research and computing infrastructures in one of Europe’s largest research facilities, located between the cities of Cologne, Düsseldorf, and Aachen
• International and interdisciplinary working atmosphere
• A comprehensive further training program
• Flexible working hours and various opportunities to reconcile work and private life
• Limited contract for 2 years with possible longer-term prospects
• Full-time position with the option of slightly reduced working hours
• Salary and social benefits in conformity with the provisions of the Collective Agreement for the Civil Service (TVöD)

Forschungszentrum Jülich aims to employ more women in this area and therefore particularly welcomes applications from women.

We also welcome applications from disabled persons.