IHP GmbH -
Leibniz Institute for High Performance Microelectronics/
Leibniz-Institut für innovative Mikroelektronik

PhD position (m/f/d) for the quantum transport characterization of SiGe-based devices

Job-ID: 0074/25 | Department: Material Research | Salary: as per tariff (TV-L) | Working Time: 40h/week | Limitation: initially two years with extension eption | Starting Date: as soon as possible

IHP is an institute of the Leibniz Association and conducts research and development of silicon-based systems and ultra high-frequency circuits and technologies including new materials. It develops innovative solutions for application areas such as wireless and broadband communication, security, medical technology, industry 4.0, automotive industry, and aerospace. IHP employs approximately 380 people. It operates a pilot line for technological developments and the preparation of high-speed circuits with 0.13/0.25 µm-SiGe-BiCMOS technologies, located in a 1500 m² cleanroom that meets the highest industrial nanotechnology requirements.

The position:
As a PhD student and member of the research group "Semiconductor Quantum Materials" within the department "Materials Research" you will contribute to the field of group IV semiconductor integration into state-of-the-art CMOS technology. You will join our team in developing strategies to optimize materials and fabrication processes for the application in gate-defined quantum dot spin qubits. Your work will focus on characterizing the electrical transport properties of devices at cryogenic temperatures down to 100 mK and in magnetic fields of up to 12 T. Our international research team, comprising both experienced scientists and enthusiastic PhD students, is excited to welcome you. We value the diversity of perspectives and are proud of the balanced gender representation within our group, which we see as a strength that enriches our collaborative work.

Your PhD project:
Your project focuses on optimizing Si/SiGe and Ge/SiGe-based field-effect stacks for use in gate-defined quantum dot spin qubits for quantum computing applications. To achieve this, you will primarily investigate two-dimensional carrier systems confined in Si or Ge quantum wells at cryogenic temperatures, using magnetotransport measurements on Hall bar–shaped field-effect transistors. These devices are fabricated in IHP's 200 mm BiCMOS pilot line. Based on key figures of merit related to 2D carrier system quality, you will provide feedback to guide the optimization of heterostructure growth and device fabrication processes.
In collaboration with the team, you will contribute to the development of strategies for improving the field-effect stack and support the advancement of nanostructured quantum devices. In the final phase of the project, you will learn to characterize quantum dot devices for spin qubit applications and contribute to further technological innovations in this field.

Your qualifications:

You hold a Master's degree in physics, electrical engineering, semiconductor technology, or a related field. Ideally, you have a solid foundation in semiconductor technology and device physics, along with hands-on experience in electrical characterization and/or device fabrication. A background in semiconductor material growth and characterization highly desirable. Proficiency in data analysis using tools such as Python, MATLAB, or similar software is expected.
We are looking for a strong team player who can plan and execute work independently while contributing effectively in a collaborative research environment. You will thrive in this position if you bring a combination of experimental expertise, analytical thinking, and problem-solving ability. Strong communication skills, a quick grasp of new tools and technologies and, above all, an independent and curious mindset will make you an ideal fit for our team. As IHP is an international research center, it is necessary that you are fluent in English. German language skills are welcome. The improvement of German language skills is expected and strongly encouraged, e.g. through in-house language courses and intensive courses.

Our Offer:

Conduct research in a challenging, multinational environment giving you excellent career opportunities. You will have the chance to establish international reputation at the edge of top-notch technologies.
It is important to us to support the individual career developments (e.g. conferences, advanced trainings) as well as the personal needs of our employees by offering flexible working hours and the possibility to work off-site. The compatibility of work and family is highly valued. More information about our scientific excellence and the working environment at IHP can be found on our website.
IHP is TOTAL E-QUALITY-certified for equal opportunities for women and men at work and actively pursues the equality of all gender and all groups of people. We promote the professional development of women and strongly encourage them to apply. Disabled applicants, qualified according to the above criteria, will be given preference over other candidates with equivalent relevant qualifications.

Further advantages:

30 days holiday | special annual payment | Company pension scheme (VBL) | Flexible working hours, also part-time (no core working hours) | Possibility to work up to 40 % independent of location according to company agreement | A wide range of further training opportunities in-house or within the framework of business trips | Discounted company ticket with monthly allowance of € 15 for various fare zones | Good transport connections, free parking at the institute | Free, confidential counselling by an external service provider in a wide variety of challenging private or professional situations, for example on how to reconcile work and family life or in psychosocial emergencies | Structured induction and actively supported integration into the institute (welcome workshop, intercultural workshop, joint leisure activities)

Your application:

Have we sparked your interest? We look forward to receiving your application in German or English via our **online application form.**

For further information regarding the position please contact: career@ihp-microelectronics.com.

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