



3 Master Theses in the field Semiconductor Devices

Job-ID: 70316/22 | Department: Technology | possibility of a parallel activity as a scientific assistant

You are a master student in physics or electrical engineering and want to write your master thesis in a Leibniz institute with state-of-the-art research infrastructure?

As a member of the High Performance Si-Technologies research group in the Technology department, you will contribute to the research of physics and technology of semiconductor devices for leading-edge applications in high-frequency electronics and photonics and explore new interesting topics for your thesis. Ideally, but not necessarily, you already have knowledge in semiconductor physics and electrical measurement. You are also a team player and have a good command of the German and English languages?

Then we offer you the following topics for your master thesis:

- **Influences of technology variants on germanium photodiode parameters:**
In addition to speed and responsivity of photodiodes, their dark current level and general yield are essential when it comes to integration in electronic-optical integrated circuits. The conditions of epitaxial growth of germanium on silicon have a direct impact on the properties of the photodiode. Within the scope of the master thesis, different technological variants and their effects on dark current and yield will be investigated, such as the use of different insulator layers (SiO₂ and SiN) and conditions of germanium epitaxy.
- **Yield and reliability studies of ultra-fast germanium photodiodes:**
A novel design that sandwiches a narrow germanium lamina between two in-situ doped silicon layers has broken world speed records. Recently demonstrated by IHP, these photodiodes with OE bandwidths from 110 to 265 GHz have shown that Si-based photodiodes can match or even surpass those from indium-phosphide-based platforms. For the practical applications of these devices, yield and reliability also play a crucial role. Within the scope of the master thesis, both technological and layout variants of ultra-fast Ge photodiodes will be investigated with respect to yield and reliability.
- **Noise characteristics of SiGe heterojunction bipolar transistors for ultrahigh-frequency applications:**
SiGe heterojunction bipolar transistors enable the shortest switching times and highest application frequencies achieved with silicon integrated circuits so far. An important parameter for the application of these transistors is their noise behavior. Within the scope of the master thesis, the noise characteristics of the latest transistor generation developed at IHP will be measured and the influences of selected steps of the manufacturing process and the transistor geometry will be systematically investigated.



Your activities:

Your tasks include the electrical characterization of semiconductor devices and the investigation of fundamental charge carrier transport processes and degradation mechanisms under operating conditions. Influences of process technology and material properties on device characteristics will be investigated in close cooperation with the team of technology developers.

Our Offer:

Gain insights into a dynamic and multinational research institute for microelectronics! You will apply your theoretical knowledge from your studies in practice and contribute to our research projects with your work! A motivated, international team, consisting of very experienced scientists as well as young colleagues, is looking forward to you. Take the chance to lay the foundation for your career in a business-oriented research institute. Your experience will be of great benefit to you, regardless of whether you want to start your career in science or in business. We guarantee flexible working hours.

In addition, we offer the possibility of a parallel activity as a scientific assistant, with a working time of max. 19 hours per week, remuneration according to the guidelines of the state of Brandenburg on the working conditions of scientific and student assistants.

It is important to us to support the individual professional development (e.g. conferences, trainings) as well as the personal needs of our employees* by offering flexible working hours and the possibility to work in the field. The task includes extensive model developments within the framework of the standardized technologies of the IHP, as well as new developments. Work-life balance is a high priority.

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.

Your application:

Have we sparked your interest? Then we look forward to receiving your application via our

[Online application form.](#)

For further information regarding the position please contact Dr. Holger Rücker:

career@ihp-microelectronics.com

