Technische Universität Braunschweig - Institut für Halbleitertechnik

Technische Universität Braunschweig

Mit über 16.000 Studierenden und 3.800 Beschäftigten zählt die Technische Universität Braunschweig zu den führenden Technischen Universitäten in Deutschland. Sie steht für strategisches und leistungsorientiertes Denken und Handeln, relevante Forschung, engagierte Lehre und den erfolgreichen Transfer von Wissen und Technologien in Wirtschaft und Gesellschaft. Konsequent treten wir für Familienfreundlichkeit und Chancengleichheit ein. Unsere Forschungsschwerpunkte sind Mobilität, Engineering for Health, Metrologie sowie Stadt der Zukunft. Starke Ingenieurwissenschaften und Naturwissenschaften bilden unsere Kerndisziplinen. Diese sind eng vernetzt mit den Wirtschafts- und Sozial-, Erziehungs- und Geisteswissenschaften. Unser Campus liegt inmitten einer der forschungsintensivsten Regionen Europas. Mit den über 20 Forschungseinrichtungen in unserer Nachbarschaft arbeiten wir ebenso erfolgreich zusammen wie mit unseren internationalen Partnerhochschulen. Das Institut für Halbleitertechnik sucht zum nächstmöglichen Zeitpunkt eine/n

Wissenschaftlicher Mitarbeiter (m/w/d) auf dem Gebiet „Integrierte photonische Resonatoren für molekulare Sensorik“.

(EG 13 TV-L, 75%)

Stadt: Braunschweig; Beginn frühestens: Frühestmöglich; Dauer: 3 years; Vergütung: EG 13 TV-L; Bewerbungsfrist: 31.07.2025

Aufgabenbeschreibung

We are offering a fully funded PhD position (initially limited to 3 years), with the opportunity to pursue a doctorate and benefit from international research stays at the University of Barcelona.

This position lies at the exciting intersection of two topics of excellence in TU Braunschweig, which are forming a strategic partnership to explore the application of integrated photonics in advanced sensing.

On one side, the group of Prof. Stefanie Kroker, a leading expert in integrated photonics, is developing next-generation photonic systems with functionality enabling the next-generation of precision sensing. This long-term scientific vision is supported by the highly regarded ERC Consolidator Grant "MightyMirrors".

On the other side, the group of Prof. J. Daniel Prades is pioneering the concept of "Ubiquitous Metrology" - an innovative approach to bring state-of-the-art metrology principles to sensor devices operating in real-world environments. This work is funded through the prestigious Alexander von Humboldt Professorship.

As a PhD researcher, you will join these two visionary initiatives at an early stage and help shape the future of integrated photonics for distributed sensing. Your work will be primarily experimental, focusing on the development of photonic resonator cavities that respond to variations in their chemical environment. The ultimate goals include:

- Achieving extremely high molecular specificity
- Reaching very low detection limits
- Enhancing sensitivity and reliability
- Enabling miniaturization and scalable production

The project involves close collaboration with specialists in optoelectronic devices, clean-room processing (including nitrides, silicon, photonic materials and hybrid integration), quantum technologies, and system integration. We are looking for a highly motivated candidate who will contribute talent, creativity, and commitment to a dynamic research environment.

Both groups are based at the Institute of Semiconductor Technology (IHT), which houses dedicated cleanroom infrastructure through the Nitride Technology Center and Epitaxy Competence Center. We are part of the Laboratory for Emerging Nanometrology (LENA), which provides cutting-edge micro- and nanoscale characterization tools. Our research is embedded within the Cluster of Excellence QuantumFrontiers and the Quantum Valley Lower Saxony (QVLS). We also maintain strong collaborations with the Department of Electronic and Biomedical Engineering at the University of Barcelona, particularly in the area of high-sensitivity photon detectors with integrated time-decay processing.

- You will conduct cutting-edge research in advanced integrated photonics, focusing on ring resonator structures, the influence of the environment on their optical properties, and the use of these effects as new molecular sensing mechanisms. This includes exploring multi-signal approaches such as time modulation and propagation time decay.
- Your work will span from lab-scale demonstrators that establish proof-of-concept, to the miniaturization of the most promising solutions into compact, integrated systems with potential for large-scale deployment.
- You will play a central role in conceptualizing, defining and assembling experimental setups, as well as in the fabrication and testing of resonators and photonic sensors.
- You will collaborate closely with in-house experts in optics, microelectronic design, clean-room processing (including nitride, silicon, and hybrid platforms), and advanced micro/nano metrology.
- You will engage with world-class research centers in sensing, metrology, and quantum technologies.
- You will actively contribute to collaborative projects with external partners and integrate into a dynamic, interdisciplinary team of photonics and sensor-device researchers within the groups of Prof. Kroker and Prof. Prades at IHT.
- You will gain valuable international experience, with the opportunity to conduct research stays at the University of Barcelona, if desired.
- You will have the opportunity to publish extensively in leading scientific journals and participate in national and international conferences.
- You may also be involved in teaching activities, including course preparation and supervision of student theses.

Erwartete Qualifikationen

- A scientific university education (Master's degree or equivalent) in the field of physics, electrical engineering or similar.

- Experience in optics, optical sensing, spectroscopy, optical imaging and image processing will be highly appreciated.
- Very high proficiency in English, fluency in the German language is preferable.
- You are flexible, can perform under pressure and work well in a team.

Unser Angebot

- Pay in accordance with the collective agreement TV-L, pay grade up to E13 with 75%, depending on the assignment of tasks and fulfilment of personal requirements. A special payment at the end of the year as well as a supplementary benefit in the form of a company pension, comparable to a company pension in the private sector.
- Counting with the support of 1-2 Master students under your supervision, that will help you boost your scientific productivity.
- Interesting and diverse tasks in a pleasant working atmosphere with a friendly and motivated team.
- A workplace that is basically suitable for part-time work, although the position is to be filled full-time, as well as flexible working and part-time options and a family-friendly university culture, awarded the “Family-friendly university” audit since 2007.
- A wide range of continuing education and company health care programs as well as a vibrant campus life in an international atmosphere.
- Financial support to carry out research stays abroad.

Bewerbung

We welcome applicants of all nationalities. At the same time, we encourage people with severe disabilities to apply. Applications from severely disabled persons will be given preference if they are equally qualified. Please attach a proof of disability to your application. We are also working on the fulfilment of the Central Equality Plan based on the Lower Saxony Equal Rights Act (Niedersächsisches Gleichberechtigungsgesetz—NGG) and strive to reduce under-representation in all areas and positions as defined by the NGG. Therefore, applications from women are particularly welcome in this case.

The personal data will be stored for the purpose of processing the application. By submitting your application, you agree that your data may be stored and processed electronically for application purposes in compliance with the provisions of data protection law. Further information on data protection can be found in our data protection regulations at https://www.tu-braunschweig.de/datenschutzerklaerung-bewerbungen . Application costs cannot be reimbursed.

Questions and Answers

Do you have any questions? For more information, please contact +49 531 391 65323 (Judith Krakowski).

Deadline for applications is July 31, 2025

If we have aroused your interest, please send your application with informative documents in PDF format, preferably by e-mail to j.krakowski(at)tu-braunschweig.de or by post to

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Weitere Informationen unter https://stellenticket.de/196429/LUH/
Angebot sichtbar bis 31.07.2025