



PhD student (m/f/d) in Integrated Circuit Design for Quantum Computer focussing on Analog and Mixed-Signal Integrated Circuits in CMOS

Braunschweig University of Technology, with its 18.500 students and about 3.700 employees, is the largest University of Technology in northern Germany. We stand for a strategic and performance-oriented thinking and acting, for relevant research, motivated teaching and a successful transfer of knowledge and technology into industry and society. We are consequently advocating family friendliness and equal opportunities. Our campus is located in one of the most research-oriented regions of Europe.

The collaboration between the Braunschweig University of Technology, Leibniz University Hannover and PTB, aims at realizing a 50-Qubit quantum computer based on trapped ions. In the frame of this research work, the **Institute for CMOS Design** is looking for talents worldwide, who want to join our team as

PhD student (m/f/d) in Integrated Circuit Design for Quantum Computer focussing on Analog and Mixed-Signal Integrated Circuits in CMOS

The position is temporary (3 years) with a possibility of extension. The location is Braunschweig. Remuneration will be in line with the current German collective pay agreement up to TV-L E13, depending on personal qualification and task assignments.

The control of quantum states of trapped ions is one of the most advances approached on the way towards error tolerant programmable quantum computers. Based on chip technology for ion traps in combination with microwave control, a 50-Qubit-System will be built by the consortium in Lower Saxony. Within this research work the Institute for CMOS Design of the Braunschweig University of Technology has the task to develop integrated circuits in CMOS and BiCMOS technologies at cryogenic temperatures, to enable scalability of qubits.

We are part of an excellent research environment with access to the unique infrastructure of the entire consortium. The team is working in an excellent national and international network and is participating in various large collaborative projects, including „Quantum Valley Lower Saxony“ and the Excellence Cluster „QuantumFrontiers“.

Tasks and assignments:

- Active participation in research projects and consortia
- Design of analog, mixed-signal and high-frequency integrated circuit for Electronic control of the ion traps, e.g. Direct Digital Synthesizer (DDS), Oscillators, Bit pattern generator, cryogenic DACs and amplitude waveform shaping
- Design of highly-integrated low-power and low-noise RF front-ends
- RF system-level concept development, level calculations and system modeling
- High-level integration of circuits into a System-on-Chip and top-level simulations
- Verification in measurement of the circuits on-wafer and on board

Required profile:

- Master degree in electrical engineering, physics or relevant field
- Knowledge in the field of analog, mixed-signal and/or RF integrated circuits
- Understanding in the field of microwave engineering and RF systems
- Experience with Cadence Virtuoso is a plus
- Experience with electromagnetics field simulation tools is a plus
- Good MATLAB skills are advantageous
- Expert knowledge in one or more of the above-mentioned research areas
- High level of personal motivation, responsibility and continuous learning abilities
- Pronounced communication and team building capabilities
- Openness to work in a diverse, international working environment
- Very good knowledge of the English (and possibly German) language
- Readiness to perform research in partner labs at various locations when necessary

For further information please contact:

Prof. Dr. Vadim Issakov, E-Mail: V.Issakov@tu-braunschweig.de

Website: www.qvls.de
www.quantumfrontiers.de

Braunschweig University of Technology offers flexible part-time models whenever possible for supporting family-friendliness. Disabled persons are preferred in case of equal suitability. Written evidence has to be presented in the application. Applications from applicants of all nationalities are welcome. Braunschweig University of Technology aims to reduce under-representation in all areas and positions as defined by the NGG. Therefore, applications from women are particularly welcome in this case.

Personal data will be stored for the purpose of carrying out the application procedure. Application costs cannot be reimbursed. Please understand that applications that are not considered can only be returned against a self-addressed and stamped envelope. By submitting your application, you agree that your application may be forwarded internally to parallel advertising procedures, provided that these fit your profile better.

Are you interested? In this case we are looking forward to your application. Please send your application via email (V.Issakov@tu-braunschweig.de) as a single PDF document. In case this is not possible, a written application may be sent to: Institut für CMOS Design, Frau Liane Meishner, Technische Universität Braunschweig, Hans-Sommer-Straße 66, 38106 Braunschweig).

Application deadline: **December 15th 2022**