TUD Dresden University of Technology, as a University of Excellence, is one of the leading and most dynamic research institutions in the country. Founded in 1828, today it is a globally oriented, regionally anchored top university as it focuses on the grand challenges of the 21st century. It develops innovative solutions for the world's most pressing issues. In research and academic programs, the university unites the natural and engineering sciences with the humanities, social sciences and medicine. This wide range of disciplines is a special feature, facilitating interdisciplinarity and transfer of science to society. As a modern employer, it offers attractive working conditions to all employees in teaching, research, technology and administration. The goal is to promote and develop their individual abilities while empowering everyone to reach their full potential. TUD embodies a university culture that is characterized by cosmopolitanism, mutual appreciation, thriving innovation and active participation. For TUD diversity is an essential feature and a quality criterion of an excellent university. Accordingly, we welcome all applicants who would like to commit themselves, their achievements and productivity to the success of the whole institution.

At the **Faculty of Electrical and Computer Engineering, Institute of Communication Technology,** the **Junior Professorship in Quantum Communication** offers a project position as

Research Associate (m/f/x)
(subject to personal qualification employees are remunerated according to salary group E 13 TV-L)

starting **as soon as possible.** The position is limited until December 31, 2025. The period of employment is governed by § 2 (2) Fixed Term Research Contracts Act (Wissenschaftszeitvertragsgesetz – WissZeitVG).

Tasks: We seek applications for a Research Associate in Quantum Technologies for the QuaPhySI project, which researches quantum bridging technologies with application potential for future generations of communication networks and towards the quantum internet. For this purpose, a holistic concept for a network architecture based on Physical Layer Service Integration (PLSI) will be designed. The compatibility with 6G networks will be ensured. The concept will be made accessible and evaluated by emulating the entire quantum-classical network protocol stack. Concrete building blocks of the roadmap are Entanglement-Assisted Data Transmission (ED) and Oblivious Transfer (OT). The project addresses secure and efficient quantum-classical communication networks, also considering quantum-classical error-correcting procedures for reliability. Within this context, the successful candidate will have to work on the theoretical definition of the relationship between industrial requirements and communication and mathematical/physical tasks in PLSI. The work will also focus on the identification of use cases for future classical quantum communication networks and the various possible industrial application scenarios considering effective, efficient and secure communication with PLSI. In parallel, the assessment from the network perspective considering the use cases and the defined KPIs will also be done. Next, the candidate will investigate the resilience of the system against possible attacks. This will include the creation of a general theory of basic protocols related to point-to-point transmissions. Next, the successful candidate will design classic quantum protocols for and characteristics of the link and network layers. This includes Investigation of methods to provide flow control and reliable communication (at bit/qubit and packet level), and management and control of entanglement generation and distribution, routing of quantum frames and impact on classical packets. Regarding the reliability of the packets, the candidate will have to deal with the design of network coding for the classical-quantum protocol stack.

Requirements: university degree (Diploma/Master) in physics, mathematics, electrical and electronic engineering, telecommunications engineering or computer science; knowledge of quantum mechanics and/or network coding is highly recommended; proficient in English and good oral and written communication skills. Former experiences with C/C++ and Python programming languages are also highly recommended.

TUD strives to employ more women in academia and research. We therefore expressly encourage women to apply. The University is a certified family-friendly university. We welcome applications from candidates with disabilities. If multiple candidates prove to be equally qualified, those with disabilities or with equivalent status pursuant to the German Social Code IX (SGB IX) will receive priority for employment.

Please send your application documents until **July 2, 2025** (stamped arrival date of the university central mail service or the time stamp on the email server of TUD applies), preferably via the TUD SecureMail Portal https://securemail.tu-dresden.de by sending it as a single pdf file to **kseniia.lemesheva@tu-dresden.de** or to: **TU Dresden, Junior Professorship in Quantum Communication, Jun.-Prof. Dr.-Ing. Riccardo Bassoli, Helmholtzstr. 10, 01069 Dresden, Germany**. Please submit copies only, as your application will not be returned to you. Expenses incurred in attending interviews cannot be reimbursed.

Reference to data protection: Your data protection rights, the purpose for which your data will be processed, as well as further information about data protection is available to you on the website: https://tu-dresden.de/karriere/datenschutzhinweis.