Faculty of Electrical and Computer Engineering

At the **Institute of Communication Technology,** the **Deutsche Telekom Chair of Communication Networks**, the **6G-life Research-Hub „Digital transformation and sovereignty of future communication networks"** offers, subject to availability of resources, three project positions 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 positions are initially limited until August 14, 2025. The period of employment is governed by § 2 (2) Fixed Term Research Contracts Act (Wissenschaftszeitvertragsgesetz – WissZeitVG).

Task: We seek applications for three positions in Quantum Technologies for the experimental realization of low-latency resilient 6G-quantum communications. Low latency will be a critical key performance indicator (KPI) in future 6G communication networks. Moreover, the experimental generation and distribution of quantum entanglement at the physical layer is critical for its exploitation in future 6G communication networks. The employment of entanglement can enable efficient and effective shared randomness, which can be used for example in compressed sensing and Post-Shannon communications. However, physical parameters like probability of correct entanglement generation and fidelity have a key role. Next, quantum routers have not been standardized yet. This both from a hardware and software perspective. Additionally, it is important to integrate such a quantum routing platform with the 6G networks. Finally, quantum communication technologies have been initially proposed to achieve unprecedented security. A well-known example is the release of various quantum key distribution (QKD) protocols for making information-theoretic secure existing and upcoming classical communications. However, the realization of quantum communication networks, and their integration with future 6G architecture, is going to open new challenges from security perspective and arise new security threats. These may be critical for the future quantum-classical architecture and can eventually decrease the achievements obtained with the convergence of quantum and classical technologies into a unique network. That is why, it is important to investigate secure and resilient solutions for future 6G-quantum networks.

Position 1 will have to design and realize in the experimental demonstrator the physical-layer protocol for entanglement generation and distribution. Different quantum entanglement sources will be considered according to the requirements of different kinds of applications.

Position 2 will have the design and realization of the quantum router and quantum routing protocols will consider first the theoretical approach and then the subsequent practical implementation and integration in the testbed. The research and design will also take into account the employment of quantum routers in future 6G metropolitan area networks.

Position 3 will ensure the design and realization of secure solutions for entanglement generation and distribution and for quantum routing. The collaboration will involve the design phase and the realization phase.

Requirements: university degree (Diploma/Master) in electrical or electronic engineering, telecommunications engineering, computer science, physics, mathematics, or equivalent; strong programming skills are highly recommended. Knowledge of quantum mechanics and focus on experimental physics can be a plus. Candidates should be proficient in English and have good oral and written communication skills.

More details about the 6G-life Research-Hub are given under www.6g-life.de

Applications from women are particularly welcome. The same applies to people with disabilities. Please send your application documents until **July 8, 2022** (stamped arrival date of the university

central mail service applies) preferably via the TU Dresden SecureMail Portal https://securemail.tu-dresden.de by sending it as a single pdf document to **recruitment.6glife@tu-dresden.de** or to: **TU Dresden, Fakultät Elektrotechnik und Informationstechnik, Institut für Nachrichtentechnik, Deutsche Telekom Professur für Kommunikationsnetze, Herrn 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.