

Positions for 3 PhD students and 2 Postdoctoral Researchers in Superconducting Qubits

We are looking for highly motivated scientists to work on experiments with superconducting qubits. These positions will be funded by the European Research Council (ERC) through the Advanced Grant „Millimeter-Wave Superconducting Quantum Circuits” - Milli-Q. The goal is to develop novel superconducting quantum circuits which are operating at frequencies one order of magnitude larger than those demonstrated until now, going up to the 100 GHz frequency range. Due to the increased qubit energy level separation, millimeter-wave quantum processors could be operated at temperatures much higher than their present counterparts, qubit logic gates can be performed faster and circuit components reduced in size thus allowing for a smaller footprint, denser packaging and better integration. These numerous potential advantages face many challenges and pose intriguing physics questions that are aimed to be answered in this project. Once successful, our approach will open a new way to build superconducting quantum computers.

The group led by Prof. Alexey Ustinov is located at the university campus of KIT and has a long successful record of exploring the physics of superconducting circuits, both classical and quantum. We are using superconducting qubits for state-of-the-art experiments, challenge new physics questions and explore opportunities for the next generation of quantum information processing. Our group pioneered frequency domain multiplexing readout of qubits, detection and manipulation of microscopic two-level defects, and studied qubit arrays as quantum metamaterials. Our labs are equipped with 6 dilution refrigerators and microwave and mm-wave measurement facilities. We have full access to the in-house cleanroom located next to the lab at Nanostructure Service Laboratory / KIT.

The multiple offered PhD and postdoc positions cover a broad range of directions within Milli-Q project, ranging from the development of cryogenic measurements for mm-wave frequencies to the fabrication of prototype mm-wave qubits and studies of their quantum coherence properties. Our project team will closely cooperate with mm-wave experts and high-frequency electrical engineers, both on and outside the KIT campus.

For further information of the available positions, contact Prof. Alexey Ustinov (ustinov@kit.edu) or Dr. Hannes Rotzinger (rotzinger@kit.edu).

Requirements

Postdocs: A doctoral degree in experimental condensed matter physics or electrical engineering. Solid publication record in experimental low-temperature and/or mm-wave physics, or more generally in experimental quantum physics.

PhD students: A master degree in experimental physics.

All applicants: Good command of English. Strong ambition towards excellence in science and technology at the highest international level is expected. Experience on superconducting circuit design, modeling, and fabrication is highly appreciated.

How to apply

To apply for the position, please submit your application via e-mail addresses given above as one single PDF document, which should include letter of motivation (no more than one page), CV (indicating your contact information, work history, list of publications, knowledge areas of physics and engineering, experimental skills, language skills, university degrees and grades, honors and awards), and two letters of recommendation or contact details of two possible referees.

Please, send your application at your earliest convenience, preferably by **July 25, 2022**. Please note that we start reviewing the applications as they come and may also hire before the deadline of the call. In the case of late applications, please contact Prof. Alexey Ustinov directly by email.

The KIT reserves the right for justified reasons to leave the position open, to extend the application period and to consider also candidates who have not submitted applications during the application period.

About Karlsruhe

Karlsruhe is a mid-sized town located at the northern edge of the Black Forest Area in south-west Germany near the border with France. The town is known for its mild climate due to its location in the Rhine valley. As the third-largest city in the state of Baden-Wuerttemberg, it offers diverse sports and leisure activities, plenty of green space and various cultural institutions. Karlsruhe has won the award “Most Bicycle Friendly City of Germany” so that no car or public transport is usually necessary. The surrounding region is inviting to hikes or bike tours in the Black Forest or the nearby Palatinate and Vosges mountain area in France.

More about KIT

The Karlsruhe Institute of Technology is the largest research institution by funding in Germany, and was created in 2009 when the University of Karlsruhe (founded 1825) merged with the Kernforschungszentrum (nuclear research center). The KIT has the status of German Excellence University and ranks close to the top of German Universities focusing on engineering, natural science, and economy. Notable alumni include Heinrich Hertz, who first demonstrated radio waves in KIT’s Physics lecture hall, and Karl Friedrich Benz who build the first automobile. The Campus South of KIT is located directly in Karlsruhe’s city center, ensuring short distances to lunch and shopping options or a relaxing sun bath in the adjacent castle garden.