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Key Laboratory of Quantum Information, CAS, University of Science and Technology of China

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Overview

Established in 2001, the Key Laboratory of Quantum Information CAS is one of the leading laboratories in quantum optics, quantum information, quantum communication, and theoretical quantum physics in China. The laboratory is in the School of Physics of the University of Science and Technology of China, and is the first Key Laboratory in the field of quantum information under the Chinese Academy of Sciences.

Research Foci

Quantum Device Group: It studies quantum transport properties of nanostructures and their applications in solid-state quantum computation. For two dimensional electron systemssuch as GaAs quantum well or monolayer graphite, the group applies the standard transport techniques that are capable of detecting exotic electron states. The group also studies coherent properties of isolated electron spins in quantum dots with the goal of realizing an elementary solid-state quantum computer.

Quantum Entanglement Network: This study focuses on the development of a quantum entanglement network, in which quantum devices like multiphoton entanglement sources, stable quantum memories, trapped ions, and platforms for efficient quantum mechanical operations are systematically integrated. The network should serve as the physical basis for distributed quantum computation.

Quantum Simulation Theory: The group focuses on the theoretical study of quantum simulation in cold atomic gases and other related physical systems. As a practical alternative to the universal quantum computers, a quantum simulator is a highly controllable device that can be used to investigate properties of other more complicated quantum systems whose characterization is typically beyond the capability of classical computers.

Quantum Cryptography Group: It designs new schemes for quantum key distribution and studies security of the schemes. The group also carries out experiments realizing quantum-key-distribution systems, and integrates these systems and devices into a wide-area quantum-key-distribution system.

Integrated Quantum Photonics Group: This group investigates on-chip preparation, manipulation, and detection of photons with the aim of realizing integrated quantum information processes. The systems studied by the group have wide applications in quantum precision measurementsand in preparing physical devicesforthe nodes of prospective quantum networks.