

Quantum optical technologies for information processing and communications

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Today quantum technologies are one of the most rapidly developed areas. Quantum technologies open new possibilities for various fields. Thanks to their unusual properties quantum systems can be considered as a basis for a new generation of high-performance computing devices (quantum computers), methods of information protection (with the use of quantum cryptography), and highly accurate measurement devices (quantum sensors and quantum metrology devices).

Recent progress is related to the development and implementation of quantum optical technologies for information processing and communications. In particular, an active field is the development of quantum key distribution devices, which use the transmission of individual quantum states of light for distributing confidential keys. In this report, a review of recent experiments on quantum key distribution in urban condition will be presented [1,2].

Quantum optical technologies are actively discussed in the context of quantum computing. First, they can be considered as a way to control quantum systems that are used ultracold atoms and ions. Second, this a computation platform. In the report, we will present an analysis of recent successes in the development of quantum computing devices, which use quantum optical technologies as the method for experimental control [3]. In particular, we will present preliminary results, which are obtained in the framework of the project on the development of a quantum computing device on the basis of ions.

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Литература

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