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Integrating quantum key distribution with optical communication networks

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Abstract

Quantum key distribution (QKD) enables two parties to share a secret key whose secrecy is guaranteed by the laws of quantum physics. QKD is the most advanced quantum technology, having a well-developed theoretical framework and experimental implementations for various industrial applications. Constructing a QKD network by connecting node pairs with QKD significantly enhances the capability of QKD: Communication paths can be made redundant and a secret key can be shared between any two parties that is completely unknows to a third party. Realization of the QKD network is a difficult task requiring a lot of effort, for example, to establish a management mechanism for securely distributing keys between nodes and supplying keys to users. The QKD network shall be a part of communication system consisting of high-speed optical network and routing mechanism.

In this talk, we discuss a possibility of integrating QKD with optical communication networks. In particular, we will review the present status of continuous-variable quantum key distribution, including optical configuration and security analysis, and would like to discuss future prospects for integration with coherent optical communications.

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