

Invited paper

Quantum Key Distribution systems and field trials

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Abstract

A recent progress of quantum key distribution (QKD) technique will be reviewed. We will also introduce key technologies of our high-speed QKD system, highly efficient photon detectors with small dark count probability, and synchronization scheme we have implemented in order to achieve long-time operation of QKD field trials.

Extended Abstract

With the Internet becoming essential to daily life, the need for its security is becoming indispensable. Quantum key distribution (QKD) is attracting a lot of attention these days as a promising candidate that could guarantee the confidentiality of cryptographic key by quantum physics. In addition to the seamless endeavor to improve the basic key generation performance, a high-speed and long-distance transmission, several experiments through field installed fibre have been exhibited towards practical use of this technique. A high-speed and long-distance key generation is realized by increasing photon detection probability and reducing error rate, which are unique requirements for QKD and different from conventional optical communication systems. A long-term QKD operation, essential requirement for the practical usage, requires stable equipment, specialized synchronization scheme, and the supervisory control system.

At the presentation, we will review a recent progress of QKD technique and the field trials. We will also introduce key technologies of our high-speed QKD system, highly efficient photon detectors with small dark count probability, and synchronization scheme we have implemented in order to achieve long-time operation of QKD field trials.



Akihiro Tanaka

Akihiro Tanaka received the B.E. degree and M.E. degree in mechanical engineering and physics from Kyoto University in 1999 and 2001 respectively.

In 2001 he joined NEC Corporation, where he worked on research of a long-haul and high-capacity optical transmission systems, a research of low-cost and metro-area transmission systems. Since 2003, he started a research of a practical realization of Quantum Key Distribution; the main focus of the research and development are high-speed key generation and long-term stable operation and the network architectures. He received the Young Researcher's Award of the Institute of Electronics, Information and Communication Engineers.