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Quantum key distribution experiment using entangled photon pairs

- Challenge to realize ultimate secure communications by using quantum mechanics -

Motivation

Quantum cryptography, which guarantees unconditional security based on the laws of quantum mechanics, is one of the most attractive secure communications. Especially, we are challenging to develop a quantum cryptography system using quantum entangled photon pairs.

Originality

We succeed in the generation of quantum entangled photon pairs in a telecom band, which are suitable for fiber transmission. We distributed each photon of entangled pair to two parties through the optical fiber. From these distributed entangled photons, we successfully generated key bit strings.

Impact

Quantum cryptography, which provides ultimately secure communications, would be realized over optical fiber networks.

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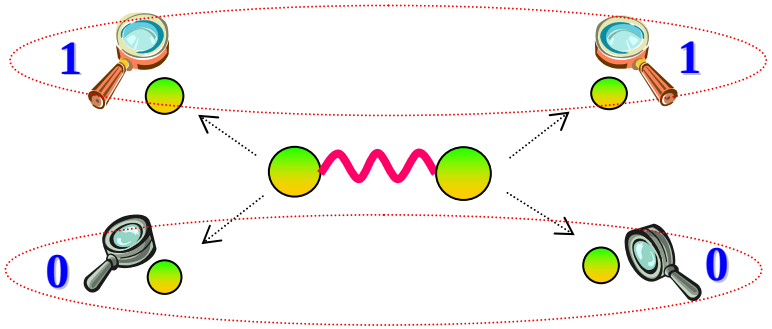
Entangled photon pairs



The correlation between measurement outcomes will appear.

Experimental setup