

Implementation of Quantum Cryptography

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Abstract.

Quantum mechanics is well known for being counter-intuitive or even bizarre. Now, it can also be useful for practical applications. Quantum cryptography could be the first application of quantum mechanics at the individual quanta level. It takes advantage of the Heisenberg uncertainties to provide an absolutely secure communication scheme. This way of turning an apparent limitation, like the uncertainty relations, into a potentially useful process, like secure communication, is an example of the new field of quantum information technology. After a basic introduction to quantum cryptography and a presentation of some experimental results, the continuous dialog between fundamental and applied issues will be further illustrated by showing that the most efficient implementation of quantum cryptography is closely related to the experimental arrangement used to violate Bell inequality, thus to demonstrate quantum non-locality. Finally, a recent demonstration of quantum cryptography using a commercial prototype between the cities of Lausanne and Geneva, via a 67 km underlake telecom cable, will be presented.