Quantum Cryptography using pulsed homedyne detection

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Abstract

We discuss a quantum key distribution scheme in which quadrature amplitudes of weak coherent pulses are measured by pulsed homodyne detection. Although the scheme inherently has a finite error rate, it allows high-efficiency detection and quantum state measurement of the transmitted light using only conventional devices at room temperature. Eavesdropping strategies that change the probability distribution of quadrature amplitudes will be detectable without announcing the bit values of test pulses. It is possible to generate secure keys even when Eve's signal-to-noise ratio is better than Bob's. Performance of the prototype experiment is close to the theoretical limit.