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Quantum Secure Direct Communication in a noisy environment: Theory and Experiment[1] GUI LU LONG, Tsinghua University — Quantum communication holds promise for absolutely security in secret message transmission. Quantum secure direct communication (QSDC) is an important branch of the quantum communication in which secret messages are sent directly over a quantum channel with security[Phys. Rev. A 65 , 032302 (2002)]. QSDC offers higher security and is instantaneous in communication, and is a great improvement to the classical communication mode. It is also a powerful basic quantum communication primitive for constructing many other quantum communication tasks such as quantum bidding, quantum signature and quantum dialogue and so on. Since the first QSDC protocol proposed in 2000, it has become one of the extensive research focuses. In this talk, the basic ideas of QSDC will be reviewed, and major QSDC protocols will be described, such as the efficient-QSDC protocol, the two-step QSDC protocol, the one-time-pad QSDC protocol, the high-dimensional QSDC protocol and so on. Experimental progress is also developing steadily, and will also be reviewed. In particular, the quantum one-time-pad QSDC protocol has recently been successfully demonstrated experimentally[arXiv:1503.00451].

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