

A Method for Transferring an Unknown Quantum State and Its Application

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(Received: 2006-5-29; Revised:)

Abstract: We suggest a method for transferring an unknown quantum state. In this method the sender Alice first applies a controlled-not operation on the particle in the unknown quantum state and an ancillary particle which she wants to send to the receiver Bob. Then she sends the ancillary particle to Bob. When Alice is informed by Bob that the ancillary particle is received, she performs a local measurement on her particle and sends Bob the outcome of the local measurement via a classical channel. Depending on the outcome Bob can restore the unknown quantum state, which Alice destroyed, on the ancillary particle successfully. As an application of this method we propose a quantum secure direct communication protocol. By introducing the decoy qubits the security of the scheme is guaranteed.

PACS: 03.67.Hk

Key words: transferring unknown quantum state, secure direct communication, controlled-not operation

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