



量子信息科技学术研讨会 (2018.9.17-21)

报告

宣布式窄带宽单光子在差分相移量子密钥分发中的应用

Application of Heralded Narrowband Single Photons in Differential-phase-shift Quantum Key Distribution

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讲者介绍 Biography

Shengwang Du, Professor of Physics in the Hong Kong University of Science and Technology. Prof Du's experimental research mainly focuses on two areas: atomic, molecular, and optical (AMO) physics, and biophysics. In AMO physics, his group is exploring fundamentals in the field of quantum optics and probing the quantum nature of light quanta. Prof. Du is also interested in developing optical microscopy tools for nano material and cell bioimaging.

报告摘要 Abstract

It is commonly believed that the frequency entanglement between paired photons reduces one of the photons to a mixed frequency (temporal) state conditioned on detecting its paired partner. This is only true when the trigger detection is slower than the two-photon coherence time. We find that the quantum-state purity of the heralded photons depends strongly on the response time uncertainty of the trigger photon detector. As the trigger response time is much shorter than the two-photon coherence time, the heralded single photon generated from the frequency-anticorrelated biphoton is projected onto a highly pure quantum state with a well-defined temporal wavefunction. Here we demonstrate using these heralded narrowband (\sim MHz) single photons with amplitude-phase modulations for realizing differential-phase-shift quantum key distribution.