



量子信息科技学术研讨会 (2018.9.17-21)

报告

不用加密的保密通信：量子安全直接通信

Secure Communication without Encryption: Quantum Secure Direct Communication

龙桂鲁教授 | 清华大学物理系教授·副系主任



讲者介绍 Biography

Gui Lu Long is a professor at Tsinghua University, fellow of IoP (UK) and fellow of APS (US), President of Associations of Asian Pacific Physical Societies, vice-chair of C13 of IUPAP (2015-7). During 1989-1993 he was a research fellow in the University of Sussex in UK, and a short-term visiting scholar at Vienna University in 2002. He proposed the first quantum secure direct communication (QSDC) protocol in the world and made founding contribution to QSDC. He established the phase matching condition in quantum search algorithm, constructed the optimal quantum exact search algorithm, which was called as Grover/Long algorithm. He experimentally demonstrated nonadiabatic holonomic quantum computing, digital simulation of quantum tunneling and so on in NMR system. He proposed the duality quantum computing formalism which admits linear combinations of unitary operators, which finds important applications in designing quantum algorithms. He and collaborators fabricated an all optical diode using coupled PT symmetric optical micro-cavities. He is an editor of Light: Science & Applications, and the Editor-in-Chief, Quantum Engineering.

报告摘要 Abstract

Quantum secure direct communication (QSDC) is one the major branches of quantum cryptography. Proposed in 2000, QSDC has been developed steadily. QSDC has the following features: 1) No key distribution; 2) No Key Management; 3) No Ciphertext. It eliminates the three security loopholes associated traditional secure communication, and changed the present infrastructure of secure communication. QSDC is also a powerful basic quantum communication primitive to build other quantum communication protocols such as quantum bidding and quantum dialogue and so on. In this talk, I will briefly introduce the basic ideas of QSDC, some typical QSDC protocols, and recent experimental development. Future perspective is also given toward the end of the talk.