



Key Pre Distribution Using Quantum Key Channel

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Abstract

Modern optical networking techniques have the potential to greatly extend the applicability of quantum communications by moving beyond simple point-to-point optical links, and by leveraging existing fibre infrastructures. We experimentally demonstrate many of the fundamental capabilities that are required. These include optical-layer multiplexing, switching, and routing of quantum signals; quantum key distribution (QKD) in a dynamically reconfigured optical network; and coexistence of quantum signals with strong conventional telecom traffic on the same fibre. We successfully operate QKD at 1310 nm over a fibre shared with four optically amplified data channels near 1550 nm. We identify the dominant impairment as spontaneous anti-Stokes Raman scattering of the strong signals, quantify its impact, and measure and model its propagation through fibre. We describe a quantum networking architecture which can provide the flexibility and scalability likely to be critical for supporting widespread deployment of quantum applications.

Index Terms- Quantum key distribution, multiple access, cryptography

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