QKD in Optical Networks

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The Situation Today / Motivation

State of the art cryptographic protocols for public networks like TLS or IPsec employ methods like RSA, Diffie Hellman or Elliptic Curve Cryptography to ensure the secure creation of a key pair. These methods are based on trap door functions that can only be inverted by solving a computational hard problem. Assuming further developments in classical as well as in quantum computations these methods can no longer guarantee for safe communication.

Abstract

We investigate the possibility to include QKD models like BB84 and SARG in actual optical networks alongside with classical signals. Our simulations include standard networks like 1G and 10G active optical Ethernet, Gigabit Passive Optical Network (GPON), Ethernet PON (EPON) as well as high capacity networks such as 10G-PON, XG-PON, WDM PON and WDM/TDM PON. The noise generation due to spontaneous Raman or Rayleigh scattering of all important telecom bands (1240nm to 1660nm) has been considered to establish guidelines for a possible integration of QKD signals.



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