Method for ultrafast, secure communication using fiber optics systems

Technology #cu12189

The ability to establish and monitor a secure connection between two parties is an essential component of a secure communication system. Quantum Key Distribution (QKD) is a technique that leverages the underlying physics of quantum mechanical interactions to share a secure connection while preventing interception. However, existing QKD protocols rely on quantum properties that suffer from low data transfer rates and are sensitive to external effects, reducing their practicality. This technology, called High-Dimensional Temporal Quantum Key Distribution (HDT-QKD), employs dispersive optics to generate an ultrafast secure connection, with data transfer speeds over 100 Mbps over distances exceeding 200 km, and is compatible with existing fiber optics communication systems.

**High-dimensional temporal quantum key distribution (HDT-QKD) provides a secure communication method using common dispersive optics**

Conventional QKD systems generate a secure connection by encoding information in photon polarization or phase states. However, commonly employed states such as position-momentum, energy-time, and orbital angular momentum are sensitive to the surrounding environment, which limits their practical implementation for secure communication. HDT-QKD improves on conventional methods by using dispersive optics to generate two mutually unbiased bases in which to establish a secure connection. Once the secure connection is established, this technology then transmits information based on the frequency and arrival time of each photon. Multiple frequency channels may even be used simultaneously, allowing this technology to potentially achieve multiple Gbps communication rates over a distance greater than 200 km. By using simple dispersive optics to allow ultrafast secure information transfer, this technology is ideal for integration with existing fiber optics networks.

**Lead Inventor:**

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Applications:

- Robust security protocol for telecommunications
- Secure transfer of information over ultrafast fiber optics networks

Advantages:

- Ideally suited for existing fiber optics communication systems
- Promises secure communication speeds exceeding 100 Mbps per channel
- Coupling multiple frequency channels would allow Gbps secure communication speed
- Achieves a secure communication distance exceeding 200 km
- Presence of an eavesdropper detectable by system

Patent Information:

Patent Pending (US 20160234017)

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Related Publications:


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