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Influence of the motion of aerospace systems on the polarization angle of qubits for free space QKD

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Abstract content
 (Max 300 words)

With the evolution of telecommunication systems and with the growing demand for systems that are secure against eavesdropping, new technologies for cryptographic systems have emerged that are based on the quantum mechanical postulates. In a quantum key distribution system, the transmitter sends a key as a random sequence of polarized photons to the receiver.

Any attempt of eavesdropping the key instantly alters the photon's polarization in accordance to the Heisenbergs's uncertainty principle.

By using established protocol, e.g. BB84 or BB92, receiver and transmitter become aware of the intruders and they can interrupt the transmission until the transmission is safe again.

Recently there has been great interest in free space quantum communication systems. A quantum cryptography system in free space is a prerequisite for safe telecommunication systems in the aerospace field and possible global quantum communication.

To build a reliable quantum cryptography system for aerospace vehicles one requires technological solutions to the challenges of synchronization, tracking and collimation of the polarization filters of the receiver and transmitter. In the present work the necessary methods for a correct collimation in different situations are shown. This study considers the atmospheric effects on the quantum state of the photon to the kind of free space link.

Apply to be
 consider for a student
 award (Yes / No)?

Yes

Level for award
 (Hons, MSc,
 PhD)?

Phd

Main supervisor (name and email)
and his / her institution

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Would you like to
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yes

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