



Canadian Association
of Physicists

Association canadienne
des physiciens et physiciennes

Contribution ID: 2119 Type: **Poster Competition (Graduate Student)** / **Compétition affiche (Étudiant(e) 2e ou 3e cycle)**

POS-5 Modeling and Characterizing Polarization Distortion for Real-world Quantum Key Distribution Implementations

Tuesday 12 June 2018 18:08 (2 minutes)

Integrity of digital security is crucial for maintaining the secrecy of banking data, personal information, company trade secrets, governmental records, and more. A perfectly implemented quantum cryptographic scheme, such as quantum key distribution (QKD), would be impossible to break. Freespace QKD systems commonly rely on polarization encoded single-photons. However, the optics required to manipulate photons can perturb the polarization, reducing the encoded state's integrity thus, decreasing the quality of the quantum channel. Here I present a method for characterizing the effects of optical elements on photon polarization with respect to QKD performance. This computational model describes polarization effects by tracing light propagation paths through many individual optical elements. This research will forward for the development of freespace QKD reliability.

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Session Classification: DAMOPC Poster Session & Finals: Poster Competition and Mingle Session with Industry Partners (8) / Employers | Session d'affiches DPAMPC et finales: Concours d'affiches et rencontres avec partenaires industriels et employeurs (8)

Track Classification: Division of Atomic, Molecular and Optical Physics, Canada / Division de la physique atomique, moléculaire et photonique, Canada (DAMOPC-DPAMPC)