



Contribution ID: 253

Type: Oral Presentation

## Quantum key distribution protocol implemented with biphotons

Monday, 4 July 2022 15:15 (15 minutes)

High-dimensional quantum key distribution has become a viable alternative towards bringing the quantum key distribution (QKD) technology closer to its wide adoption owing to its capability of tolerating high error rate and high photon information capacity. In this work, we propose of measurement device independent QKD protocol which exploits the polarization state of a biphoton to encode information on a three level quantum system - a qutrit. Also, we investigate the performance of the proposed protocol by simulating the secret key rate as function of transmission

distance in the finite regime. The simulation results demonstrate that the protocol can achieve a significant secret key rate at reasonable transmission distances of about 90 km with  $10^{16}$  signals. Furthermore, our results indicate that reasonable key rates are achieved with minimum data size of about  $10^{14}$  signals which are realizable with the current technology.

### Apply to be considered for a student ; award (Yes / No)?

No

### Level for award;(Hons, MSc, PhD, N/A)?

N/A

**Primary authors:** SEKGA, Comfort (Department of Physics and Astronomy, Botswana International University of Science and Technology, Private Bag 16 Palapye, Botswana); Dr MAFU, MHLAMBULULI (BOTSWANA INTERNATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY)

**Presenter:** SEKGA, Comfort (Department of Physics and Astronomy, Botswana International University of Science and Technology, Private Bag 16 Palapye, Botswana)

**Session Classification:** Theoretical and Computational Physics

**Track Classification:** Track G - Theoretical and Computational Physics