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An Investigation of Synchronisation Techniques for a Handheld QKD Device

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The importance of cryptography has become more prevalent in contemporary communication and the commercial use of Quantum Key Distribution (QKD) is now a realistic option for fibre networks. Long-range, free-space QKD and miniaturised, personal QKD devices are emerging fields of research aiming towards future commercial use. Previously, a handheld QKD device was developed using the COW protocol to exchange the encryption key between the sender and receiver [1]. An optical synchronisation system was developed for the handheld device establishing real time synchronisation between the sender and receiver.

This paper will investigate the viability of other synchronisation techniques appropriate for a handheld QKD device. The first technique will use asynchronous communication to establish communication between the sender and receiver. The second technique will use a radio channel to establish synchronisation, based on the methods designed in [2]. The tracking capabilities of the radio synchronisation method will assist a handheld QKD device in establishing a connection between devices that are not pre-aligned.

[1] Pillay, S., Mariola, M., Mirza, A. and Petruccione, F., Handheld QKD device using the COW protocol, in The Proceedings of the 60th Annual Conference of the South African Institute of Physics (SAIP2015)(ADDENDUM), edited by Makaiko Chithambo (RU) and André Venter (NMMU) (2015), pp. 29 - 35. ISBN: 978-0-620-70714-5.

[2] Mariola, M., Mirza, A. and Petruccione, F., Quantum cryptography for satellite communication, in Proceedings of SAIP2011, the 56th Annual Conference of the South African Institute of Physics, edited by I. Basson and A.E. Botha (University of South Africa, Pretoria, 2011), pp. 403 - 408. ISBN: 978-1-86888-688-3.

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

yes

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

PhD

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Would you like to submit a short paper for the Conference Proceedings (Yes / No)?

yes

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