

# Improving the BB84 quantum key distribution protocol as based on graph theory

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**Abstract.** Key distribution is considered to be among the most significant stages in any cryptographic system, and quantum key distribution is a secure method used to exchange keys between entities involved in communication.

In this study, we propose to improve the BB84-quantum key distribution protocol using graph-based coding, where agreement between the two parties is agreed on the graph used in quantum-bases encoding at both ends.

This paper presents a simulation of the proposed protocol using python language. The experimental results, which have been very promising, show that the proposed protocol is more effective and secure than the standard BB84 protocol.

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