

Quantum Communications for Image Transmission over Error Prone Channels

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Abstract

Introductions of quantum communications, enabled by advancements in quantum computing, is expected to play a significant role in the field of communications. Inherent properties of quantum objects, such as superposition and entanglement have the potential to provide novel solutions to overcome the challenges encountered by classical communication systems in bandwidth-intensive applications such as media transmission. This research explores the performance of a quantum communication system in image transmission using quantum superposition and investigates its performance using a simple quantum channel model. With increase of channel noise, there are significant gains in the rate distortion performance of images transmitted over the quantum channel, compared to an ideal classical channel. This novel attempt in constructing a quantum communication-based image transmission system indicates the potential of the approach to be applied to satisfy the ever-increasing demands of high-quality media transmission applications.

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