Continuous variable entanglement distillation of Non-Gaussian Mixed States

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Many different quantum information communication protocols such as teleportation, dense coding and entanglement based quantum key distribution are based on the faithful transmission of entanglement between distant location in an optical network. The distribution of entanglement in such a network is however hampered by loss and noise that is inherent in all practical quantu channels. Thus, to enable faithful transmission one must resort to the protocol of entanglement distillation. In this paper we present a detailed theoretical analysis and an experimental realization of continuous variable entanglement distillation in a channel that is inflicted by different kinds of non-Gaussian noise. The continuous variable entangled states are generated by exploiting the third order non-linearity in optical fibers, and the states are sent through a free-space laboratory channel in which the losses are altered to simulate a free-space atmospheric channel with varying losses. We use linear optical components, homodyne measurements and classical communication to distill the entanglement, and we find that by using this method the entanglement can be probabilistically increased for some specific non-Gaussian noise channels.

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