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**Investigating the Possibility of Overcoming Photon Loss via Photon-Phonon Interactions** BHASKAR ROY BARDHAN, JONATHAN DOWLING, Louisiana State University — In optical quantum information processing, photons are usually routed through optical fibers or waveguides. However, absorption of the photons in the fiber during the transmission introduces errors in the information processing. We model the absorption of photons with the creation of vibrational excitation (phonon) in one of the modes of the fiber, and investigate how the decay rate can be modified with various density of phononic modes and fluctuations in the fiber. Decoherence effects are studied in terms of the spectral density of the bath and the resulting decoherence function. Moreover, we analyze the effects of Markovian and non-Markovian environments on the absorption rate and see if well-known open-loop control techniques such as dynamical decoupling can be used, under suitable approximations, to overcome the losses due to the photon absorption.

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