Quantum Physics

Capacities of lossy bosonic channel with correlated noise

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We evaluate the information capacities of a lossy bosonic channel with correlated noise. The model generalizes the one recently discussed in [Phys. Rev. A 77, 052324 (2008)], where memory effects come from the interaction with correlated environments. Environmental correlations are quantified by a multimode squeezing parameter, which vanishes in the memoryless limit. We show that a global encoding/decoding scheme, which involves input entangled states among different channel uses, is always preferable with respect to a local one in the presence of memory. Moreover, in a certain range of the parameters, we provide an analytical expression for the classical capacity of the channel showing that a global encoding/decoding scheme allows to attain it. All the results can be applied to a broad class of bosonic Gaussian channels.

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