Stochastic Noise-Free Amplification

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It is well known that amplification is always accompanied with fluctuations. It is a problem of interest whether we can amplify a signal with no added noise. This problem was studied in the 1990s [1], and we proposed a scheme for noise-free amplification in which there was no added noise in the quadrature of interest and all the noise was added in the conjugate quadrature [2]. Here we discuss schemes where there is no added noise in either quadrature in the process of amplification such that the amplification process becomes probabilistic [3]. We also propose a protocol for improving quantum entanglement. These protocols are based on a quantum scissor scheme [4].

References

[1] M O Scully and M S Zubairy, Quantum Optics, Cambridge University Press, 1997

[2] M O Scully and M S Zubairy, Opt. Commun. **66**, 303 (1988)

[3] L Hu, M Al-amri, Z Liao and M S Zubairy, Phys. Rev. A **100**, 052322 (2019)

[4] D T Pegg, L S Phillips and S M Barnett, Phys. Rev. Lett. **81**, 1604 (1998)