

Abstract Submitted
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Quantum-limited amplification via reservoir engineering A. METELMANN, A.A. CLERK, Department of Physics , McGill University — We describe a new kind of phase-preserving quantum amplifier which utilizes dissipative interactions in a parametrically-coupled three-mode bosonic system [1]. The use of dissipative interactions provides a fundamental advantage over standard cavity-based parametric amplifiers: large photon number gains are possible with quantum-limited added noise, with no limitation on the gain-bandwidth product. Our approach is related to reservoir engineering, where one constructs a non-trivial dissipative reservoir that relaxes the system to a desired target state. We instead realize a dissipative amplification process mediated via an engineered reservoir. The proposed scheme is simple enough to be implemented both in optomechanical systems and in superconducting microwave circuits.

[1] A.Metelmann and A.A. Clerk, ArXiv e-prints (2013), 1311.0273.

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