Abstract Submitted
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Squeezing as a route to photonic analogues of topological superconductors MARTIN HOUDE, McGill Univ, VITTORIO PEANO, CHRISTIAN BRENDEL, FLORIAN MARQUARDT, University of Erlangen-Nrnberg, AASHISH CLERK, McGill Univ — There has been considerable recent interest in studying topological phases of photonic systems. In many cases the resulting system is described by a quadratic particle-conserving Hamiltonian which is directly equivalent to its fermionic counterpart. Here, we consider a class of photonic topological phases where this correspondence fails: photonic systems where particle-number non-conserving terms break time-reversal symmetry [1]. We show that these phases support protected edge modes which facilitate chiral inelastic and elastic transport channels. We also discuss the possibility of quantum amplification using these edge states. Our system could be realized in a variety of systems, including nonlinear photonic crystals, superconducting circuits and optomechanical systems.

[1] Vittorio Peano, Martin Houde, Christian Brendel, Florian Marquardt, and Aashish Clerk, arXiv:1508.01383 (2015).

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