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Using topology and parametric driving to design robust, non-reciprocal quantum amplifiers MARTIN HOUDE, McGill Univ, VITTORIO PEANO, FLORIAN MARQUARDT, Erlangen-Nuremburg, AASHISH CLERK, McGill Univ — Among the many motivations for the study of topological photonic systems is the possibility to realize new kinds of robust non-reciprocal devices. Here, we discuss a fundamentally new kind of topologically protected device, an amplifier based on exploiting the unstable edge states that arise when one combines a synthetic gauge field with parametric driving in a coupled cavity array. By coupling to input/output waveguides, we obtain a quantum-limited, non-reciprocal amplifier that shows robustness both against backscattering *and* against internal losses. We also discuss the generation of squeezed light in such a system, as well as quantum heating effects and the emergence of an effective temperature. Our system could be realized in a variety of settings, including arrays of coupled superconducting microwave cavities where time-reversal symmetry is broken (e.g. Ref. [1]). [1] Brandon M.Anderson, Ruichao Ma, Clai Owens, David I.Schuster, Jonathan Simon. arXiv.1605.03177

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