

Abstract Submitted
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Non-linear processes in thin titanium nitride transmission lines for parametric amplification MICHAEL VISSERS, JIANSONG GAO, SUP-TARSHI CHAUDHURI, CLINT BOCKSTIEGEL, MARTIN SANDBERG, DAVID P. PAPPAS, National Institute of Standards and Technology - Boulder — Nitride superconductors, such as titanium nitride and niobium titanium nitride, are a non-linear, low dissipation medium at microwave frequencies. The lossless nonlinearity may be probed and utilized. Important applications include generation of higher harmonics, e.g. $3f$, and a microwave version of the optical paramagnetic amplifier, i.e. the degenerate-pump case of four-photon mixing (FPM). An amplifier based on these principles should allow for very wide bandwidth, low noise (quantum limited) and high dynamic range devices. These measurements are performed via a single layer, 3 meter long TiN spiral and measured at temperatures below 100 mK. Initial results of the design, fabrication, testing, and impedance optimization of a titanium nitride based parametric amplifier are presented.

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