Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Microfabrication of low-loss lumped-element Josephson circuits for non-reciprocal and parametric devices KATARINA CICAK, FLORENT LECOCQ, NIST - Boulder, LEONARDO RANZANI, Raytheon BBN Technologies, GABRIEL A. PETERSON, SHLOMI KOTLER, JOHN D. TEUFEL, RAYMOND W. SIMMONDS, JOSE AUMENTADO, NIST - Boulder — Recent developments in coupled mode theory have opened the doors to new nonreciprocal amplification techniques that can be directly leveraged to produce high quantum efficiency in current measurements in microwave quantum information. However, taking advantage of these techniques requires flexible multi-mode circuit designs comprised of low-loss materials that can be implemented using common fabrication techniques. In this talk we discuss the design and fabrication of a new class of multi-pole lumped-element superconducting parametric amplifiers based on Nb/Al-AlOx/Nb Josephson junctions on silicon or sapphire. To reduce intrinsic loss in these circuits we utilize PECVD amorphous silicon as a low-loss dielectric ($\tan\delta \sim 5 \times 10^{-4}$), resulting in nearly quantum-limited directional amplification.

Katarina Cicak
NIST - Boulder

Date submitted: 10 Nov 2016 Electronic form version 1.4