Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

**Multimode Entanglement Generation in a Parametric Superconducting Cavity** C. W. S. CHANG, A. M. VADIRAJ, IQC, ECE, University of Waterloo, P. FORN-DAZ, IQC, University of Waterloo, C. M. WILSON, IQC, ECE, University of Waterloo — Parametric processes in microwave system are a source of nonclassical radiation with a number of potential applications in quantum information processing. Here we have implemented and experimentally verified a source of entangled microwave fields. Implementing a tunable, multimode microwave resonator with 3 modes in the common 4-12 GHz range, we performed two-mode parametric down-conversion between pairs of modes and observed the induced correlations in their voltage quadratures. With the system gain and noise calibrated using a shot noise tunnel junction, we have verified pairwise entanglement among the frequency modes. By introducing a second pump tone, its possible to simultaneously observe correlations between all 3 modes. We study the possibility of generating multimode entanglement in this way.

C. W. S. Chang
IQC, ECE, University of Waterloo

Date submitted: 11 Nov 2016 Electronic form version 1.4