Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Quantum Heat Engines using Superconducting Circuits A. M. VADIRAJ, C. W. S. CHANG, POL FORN-DIAZ, I. NSANZINEZA, H. PERCIVAL, C. WARREN, C. M. WILSON, Institute for Quantum Computing, University of Waterloo — Quantum heat engines are prototypical systems for studying the interplay between classical thermodynamics and quantum mechanics. Extensive theoretical investigations of these engines have predicted novel effects absent from classical enginges, but no experiment has confirmed these predictions. We propose to build a quantum heat engine from a system of nonlinearly coupled superconducting microwave resonators. The working substance of the engine is photons in one of the resonators. The resonators are coupled via a superconducting quantum interference device (SQUID) leading to an optomechanical interaction where the photon number in one resonator couples to the coherent current in the other. Our "photonic pisto" is an all electrical system which makes use of this interaction in order to perform useful work. We will present preliminary results which characterize our engine.

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Date submitted: 11 Nov 2016 Electronic form version 1.4