Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

Non-equilibrium quantum heating effects in driven, strongly-interacting optomechanics AASHISH CLERK, MARC-ANTOINE LEMONDE, Department of Physics, McGill University — We study the influence of weak, nonlinear single-photon optomechanical interactions in a strongly driven cavity, focusing on the regime where these interactions become resonant due to the formation of optomechanical polaritons. We extend the Keldysh field-theory approach to this problem formulated in our previous work[1] to now consider how zero-point fluctuations give rise to effective temperatures in this driven, interacting system. We show that this quantum heating has distinct signatures in the effective temperature of both the photonic and phononic degrees of freedom, and can in principle be detected by looking at the spectrum of the light leaving the cavity.

[1]M.-A. Lemonde et al, Phys. Rev. Lett. **111**, 053602 (2013).

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Date submitted: 14 Nov 2014 Electronic form version 1.4