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Quadratic optomechanical interaction in the reversed dissipation regime HYOJUN SEOK, Department of Physics Education, Kongju National University, JAE HOON LEE, Center for Time and Frequency, Division of Physical Metrology, Korea Research Institute of Standards and Science — Cavity optomechanics is an important platform for which the interaction between light and the motional degrees of freedom of a mechanical oscillator can be engineered for specific objectives such as cooling the mechanical state or amplifying the electromagnetic field. Here we theoretically examine an optomechanical resonator coupled to both mechanical and optical reservoirs in the reversed dissipation regime. We show that in the case of quadratic coupling between the electromagnetic field and mechanical oscillator, the linewidth of the noise spectra of the cavity field is dependent on the mean phonon number of the mechanical oscillator. Using advanced fabrication methods for optomechanical devices, we propose to develop reservoir engineered optomechanical devices for temperature measurement in the quantum regime.

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