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Nearly Perfect Squeezing of the Signal mode in Parametric Oscillation with Coherent and Squeezed pumping[1] DANIEL ERENSO, Middle Tennessee State University — A degenerate parametric oscillator operating above threshold is studied when the cavity is injected by a squeezed vacuum field at the second harmonic frequency. We presented a different method of finding the Wigner function for the intracavity modes. We use the solution of the quantum Langevin equation for the signal and pump modes to construct the steady-state Wigner function for the joint pump-signal mode. Then, the one-mode Wigner functions for the signal and pump modes are derived and the corresponding phase space is studied. These functions are used to determine the quantum fluctuations in the intracavity signal and pump mode field quadratures. The results have shown that nearly perfect suppression of quantum noise can be achieved in both the signal and pump modes. We have also studied the spectrum of the squeezing for cavity output signal mode; our result reveals nearly perfect squeezing can be achieved by controlling the relative cavity damping rates between the signal and pump modes. The second-order intensity correlation for zero time delay also studied for each mode and it is found that intracavity photons are always bunched, independent of the relative phase of the squeezed vacuum field with respect to the driving coherent field.

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