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A Quantum-Langevin Model for Non-Equilibrium Condensates

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Abstract:

We derive the quantum-Langevin equations for a cavity field coupled to two-level emitters inhomogeneously pumped. For sufficiently strong pumping, the linearized equations admit a spontaneous $U(1)$ symmetry breaking solution, related to the appearance of a condensate. Some physical quantities are computed above threshold and discussed. Finally, in the good-cavity regime, an effective equation for the cavity field is derived and the connection with the usual stochastic Gross-Pitaevskii equation is established.