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【455】Dissipative phase transition of optomechanical systems

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In this work, we studied dissipative phase transitions (DPT) in optomechanical systems. We applied the stability analysis at a well-defined thermodynamic limit to arrive at the corresponding phase diagram, which exhibits two types of instability lines: soft and hard mode instabilities—directly related to DPTs. The optomechanical phase diagram shows a rich structure composed of first and second-order DPT (with and without symmetry breaking). The analysis is supplemented with the computation of critical exponents and corresponding universality class. Finally, we studied the quantum properties of the steady-state quantified via squeezing and entanglement. We demonstrate that one can boost these quantities by applying auxiliary passive linear optic operations to the steady-state.

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