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【558】Dissipative time-crystal phase in parametrically unstable optical cavities

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We explore theoretically the behavior of two coupled nonlinear photonic cavities, in presence of inhomogeneous coherent driving and local dissipations. By solving numerically the quantum master equation, we extrapolate the properties of the system in a well defined thermodynamical limit of large photon occupation. We focus on the peculiar regime where the mean field Gross-Pitaevskii approach predicts a unique parametrically unstable steady-state solution. Here,the dynamics of the open quantum system exhibits a time cristal behavior characterized by the presence of purely imaginary eigenvalues in the spectrum of the Liouvillian superoperator at the thermodynamical limit.When the amplitude of the inhomogeneous driving is changed,we observe the emergence of two dissipative phase transitions from the time cristal to the fully classical coherent phase.

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