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【405】Phase transition in the dynamical response of driven-dissipative light-matter systems

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We study a paradigmatic quantum-optical model, where a collection of two-level systems interact with both quadratures of a cavity mode. The closed system exhibits rich physics, including discrete and continuous symmetry-breaking phase transitions. Exploring the dynamical response, we find an additional transition manifesting in the system's frequency response. Particle-hole like processes exchange due to a soft mode gap closing. In the driven-dissipative version of this model the phase diagram is profoundly altered. Novel regions of coexistence of phases appear at the expense of broken continuous symmetry transitions. Using Keldysh formalism, we show that the phase transition in frequency domain survives and the system shows signature of a Fano resonance. Our predictions pave the way for experimental observation of this effect.

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