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(G) The van der Pol-Duffing Oscillator and its Application to Gain-driven Light-matter Interaction

Tuesday, May 28, 2024 11:15 AM (15 minutes)

We report the observation of the frequency nonlinearity during amplitude stabilization of the gain-embedded resonator which was previously interpreted as a van der Pol oscillator. Our investigation reveals that this specific nonlinear oscillation is more accurately described by the van der Pol-Duffing oscillator model. We initially observed this phenomenon in a gain-embedded circuit oscillator and noted bistable behaviour upon coupling with a damped resonance. Then, in a gain-embedded cavity, we experimentally verified this nonlinear phenomenon. The bistable behavior of the cavity-magnonic polariton is well-fitted by this van der Pol-Duffing model.

Keyword-1

nonlinear oscillator

Keyword-2

cavity-magnonic polariton

Keyword-3

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