Canadian Association of Physicists
Association canadienne des physiciens et physiciennes

Contribution ID: **4106** Type: **Oral not-in-competition (Graduate Student) / Orale non-compétitive (Étudiant(e) du 2e ou 3e cycle)**

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

Tuesday 28 May 2024 11:15 (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 oscillationn 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

Author: ZHANG, Chunlei (University of Manitoba)

Co-authors: KIM, Mun; Prof. WANG, Jianbo (Lanzhou University); HU, Can-Ming (University of Manitoba)

Presenter: ZHANG, Chunlei (University of Manitoba)

Session Classification: (DCMMP) T1-7 Light Matter Interaction | Interaction lumière-matière (DPMCM)

Track Classification: Technical Sessions / Sessions techniques: Condensed Matter and Materials Physics / Physique de la matière condensée et matériaux (DCMMP-DPMCM)