



Canadian Association  
of Physicists

Association canadienne  
des physiciens et physiciennes

Contribution ID: 4214 Type: **Poster Competition (Graduate Student) / Compétition affiches (Étudiant(e) 2e ou 3e cycle)**

## **(G\*) (POS-60) Low Phase Noise Microwave Oscillator Based on Gain Driven Polariton**

*Tuesday 28 May 2024 17:47 (2 minutes)*

High-end microwave systems rely heavily on oscillators with minimal phase noise. The research work introduces a novel method to decrease phase noise by employing a gain-driven polariton platform. Through coherent coupling-induced mode hybridization, frequency distribution around the carrier signal is effectively suppressed.

The approach to achieve minimal phase noise performance will be shown using three prototypes. The first prototype is used to demonstrate the phase noise reduction mechanism (more than 25dB). The second prototype, optimized to operate at a fixed frequency of 3.5GHz, exhibits remarkable phase noise levels of -131 dBc/Hz and -133 dBc/Hz at 10 kHz and 100 kHz offset frequencies, respectively. The third prototype offers a tuning range from 2.1 to 2.7 GHz

The research work merges gain-embedded cavity technology with YIG oscillator technology using cavity magnonics. The integration results in improved spectral purity, leveraging the synergy between the two mature technologies.

### **Keyword-1**

Microwave Frequency Oscillator

### **Keyword-2**

Cavity Magnonics

### **Keyword-3**

Phase Noise

**Primary author:** KIM, Mun

**Co-authors:** HU, Can-Ming (University of Manitoba); LU, Chenyang Jerry (University of Manitoba); ZHANG, Chunlei (University of Manitoba)

**Presenter:** KIM, Mun

**Session Classification:** DCMMP Poster Session & Student Poster Competition (11) | Session d'affiches DPMCM et concours d'affiches étudiantes (11)

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