SEMINAR ANNOUNCEMENT

DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING
Faculty of Engineering
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Area: Microelectronic Technologies and Devices

Host: Dr. Lee Kyusup

TOPIC	**:**	**Antiferromagnetic Spin Resonance Detection And Manipulation**
SPEAKER	**:**	**Mr Yang Dongsheng** **Graduate Student, ECE Dept, NUS**
DATE	**:**	**Thursday, 7 January 2021**
TIME	**:**	**10.00AM to 11.00AM**
WEBINAR	**:**	**Join Zoom Meeting** **https://nus-sg.zoom.us/j/7851761044?pwd=bWVlTkc1YkRUYUhlbUkxcEtQK0Ewdz09** **Meeting ID: 785 176 1044** **Password: 7pyRQi**

ABSTRACT

There is a rapidly growing interest in the development of tunable emitters and detectors operating in over hundreds of GHz up to THz frequency range. Antiferromagnetic (AFM) material whose spin resonance frequency lying in this frequency range is inherently suitable to achieve these goals. The rather higher resonance frequency and vanishing macroscopic magnetization have made it challenging to detect AFM spin resonance by using traditional electric approaches. In this report, the spin behaviours of a typical AFM material - Nickel Oxide(NiO) - are studied in this work by using low-wavenumber Raman and THz spectroscopy. Three spin resonance modes - twisted two spin resonance modes at around 1.0 THz frequency by both Raman and THz measurement while a low-lying mode at around 400 GHz is only observed by Raman spectroscopy. These three different mode frequencies decrease as increasing temperature but at different slopes. These modes can be well described by using a more complex eight-sublattice model that ion-interaction is involved. Further studies show that the 1.0 THz resonance mode can be tuned by applying a current through NiO/Pt bilayer, achieving over 100 GHz frequency shift. This phenomenon is explained as thermal-dominant behaviours but still, we couldn't rule out other potential contributors like SOT or SEE.

BIOGRAPHY

Yang Dongsheng is currently pursuing a Ph.D. in the Department of Electrical and Computer Engineering, National University of Singapore. He received M.Eng in Optics Engineering from China in 2015. His research interests include Terahertz spectroscopy, antiferromagnets and spintronics.