

SEMINAR ANNOUNCEMENT

DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING
COLLEGE OF DESIGN AND ENGINEERING

Website: <https://cde.nus.edu.sg/ece>

Area: Microelectronic Technologies & Devices (MTD)

Host: Dr Chen Chufan

TOPIC	:	Large spin hall conductivity of type-II dirac semimetal PtTe ₂ based efficient spintronic terahertz emitter
SPEAKER	:	Mr Chen Xinhou Graduate Student, ECE Dept, NUS
DATE	:	Friday, 25 April 2025
TIME	:	10:00AM-10:40AM
VENUE	:	Join Zoom Meeting https://nus-sg.zoom.us/j/85899196374?pwd=ShovjLrUIV3lozSbYxzqn4vbfh6Za2.1 Meeting ID: 858 9919 6374 Passcode: 00678

ABSTRACT

The remarkable spin-charge interconversion ability of transition metal dichalcogenides (TMDs) makes them promising candidates for spintronic applications. Nevertheless, their potential as spintronic terahertz (THz) emitters (STEs) remains constrained mainly due to their sizable resistivity and low spin Hall conductivity (SHC), which consequently result in modest THz emission. In this work, the TMD PtTe₂, a type-II Dirac semimetal is effectively utilized to develop efficient STEs.

This high efficiency primarily results from the large SHC of PtTe₂, stemming from its low resistivity and significant spin-to-charge conversion efficiency, attributed to surface states and the local Rashba effect in addition to the inverse spin Hall effect. Remarkably, the peak THz emission from PtTe₂/Co-STE exceeds that of Pt/Co-STE by ~15% and is nearly double that of a similarly thick Pt/Co-STE. The efficient THz emission in the PtTe₂/Co heterostructure opens new possibilities for utilizing the semimetal TMDs for developing THz emitters.

BIOGRAPHY

Xinhou Chen is currently pursuing his Ph.D. degree under the supervision of Prof. Hyunsoo Yang in the Department of ECE, NUS. His current research interests are in ultrafast pulse source.

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