

Seminar On

Terahertz Optoelectronics for Non-Invasive Imaging and Beyond

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Date : 28 May 2025 (Wednesday)
Time : 11:00 am – 12:00 nn
Venue : Room 15-202, 15/F, State Key Laboratory of Terahertz and Millimeter Waves,
Lau Ming Wai Academic Building, City University of Hong Kong

Abstract

Terahertz (THz) imaging technology is growing rapidly due to its potential applications in material exploration, non-destructive evaluation, industrial inspection, and bioinformatics. However, the practical feasibility of THz imaging systems is significantly constrained by the low efficiency of active THz devices, long imaging acquisition time, insufficient use of THz signal datasets, and their bulky nature. In this talk, I will present our recent research on high-precision THz imaging systems, starting from material development, THz optoelectronics designs, and system integration toward image reconstruction modalities for on-site applications. As the image data quality and data acquisition speed highly rely on the brightness of THz sources, we have developed high-performance THz plasmonic photoconductive sources generating mW-level radiating power over a several-THz spectral range, which offers excellent time-resolved raw data for further image restoration and reconstruction. I will further introduce some of our image reconstruction approaches – equalized compressed sensing imaging, multi-scale deep-learning fusion imaging, and compressive hybrid neural network – that further speed up the data acquisition process and achieve significantly better reconstructed imaging quality compared with conventional THz CT modalities. This paves the way toward real-time, hyperspectral THz 3D imagers in the near future, which opens the door for various exciting applications in non-destructive sensing, imaging, and material inspection.

Biography

Dr. Shang-Hua (Steve) Yang is an Associate Professor in the Department of Electrical Engineering at National Tsing Hua University. Dr. Yang is renowned for his significant contributions to THz optoelectronics, communication, imaging, and innovative plasmonic photonics applications. His research findings are published in over 100 refereed papers in peer-reviewed journals and conference proceedings. Dr. Yang has received several prestigious awards, including the IEEE Antennas and Propagation Society Doctoral Research Award, MOST Young Scholar Fellowship, NTHU Young Faculty Research Award, Human Frontier Science Program Research Grant Award, and Ta-You Wu Memorial Award (2024). Dr. Yang currently serves as the Director of the NTHU THz Optics & Photonics Center, Taiwan's first dedicated THz research center. He is a senior member of IEEE, Optica, and SPIE.

*** ALL ARE WELCOME ***

Enquiries:

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