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State Key Laboratory of Terahertz and Millimeter Waves
香港城市大學
City University of Hong Kong

Department of Electrical Engineering
香港城市大學
City University of Hong Kong

Seminar On

Sub-Terahertz Passive Devices and Test Metrology

Professor James C. M. Hwang
Cornell University, Ithaca, New York 14853 USA

Date : **25 November 2022 (Friday)**

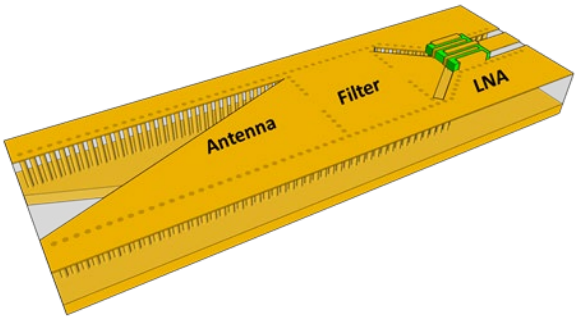
Time : **4:00pm – 5:00 pm (UTC+08:00) Hong Kong**

Onsite (with limited seats) is for City University of Hong Kong (CityU) staff and students only
Online (Zoom) is for the participants outside CityU

Venue : **Room 15-202, 15/F, Lau Ming Wai Academic Building, CityU (Lift 1 or 2)**

Registration: https://events.vtools.ieee.org/event/register/331973

Abstract



As 6G wireless communications push the operation frequency above 100 GHz, it is critical to have low-loss passive devices that can be accurately tested. To this end, D-band (110 GHz to 170 GHz) substrate-integrated waveguides (SIWs) are designed on a 100-μm-thick SiC substrate. The fabricated SIWs are characterized in a single sweep from 70 kHz to 220 GHz with their input/output transitioned to grounded coplanar waveguides (GCPWs). From CPW-probed scattering parameters, two-tier calibration is used to extract the intrinsic SIW characteristics after de-embedding the SIW-GCPW transitions. In general, the record low loss measured agrees with that obtained from finite-element full-wave electromagnetic simulation. For example, across the D band, the average insertion loss is approximately 0.2 dB/mm, which is several times better than that of coplanar or microstrip transmission lines fabricated on the same substrate. A 3-pole filter exhibits a 1-dB insertion loss at 135 GHz with 20-dB selectivity and 11% bandwidth, which is order-of-magnitude better than typical on-chip filters. These results underscore the potential of using SIWs to interconnect transistors, filters, antennas, and other circuit elements on the same substrate for monolithic integration.

Biography

James Hwang is a professor in the Department of Materials Science and Engineering at Cornell University. He graduated from the same department with a Ph.D. degree. After years of industrial experience at IBM, Bell Labs, GE, and GAIN, he spent most of his academic career at Lehigh University. He cofounded GAIN and QED; the latter became the public company IQE and remains the world's largest compound-semiconductor epitaxial wafer supplier. He used to be a Program Officer at the U.S. Air Force Office of Scientific Research for GHz-THz Electronics. He had been a visiting professor at Cornell University in the US, Marche Polytechnic University in Italy, Nanyang Technological University in Singapore, National Chiao Tung University in Taiwan, and Shanghai Jiao Tong University in China. He is an IEEE Life Fellow and a Distinguished Microwave Lecturer. He is also a Track Editor for the IEEE Transactions on Microwave Theory and Techniques. He has published approximately 400 refereed technical papers and been granted ten U.S. patents. He has researched the design, modeling and characterization of optical, electronic, and micro-electromechanical materials, devices, and circuits. His current research interest focuses on high-frequency (> 110 GHz) devices and circuits for 6G wireless communications and other applications.

***** ALL ARE WELCOME *****

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