



THE CHINESE UNIVERSITY OF HONG KONG
Department of Electronic Engineering

Distinguished Visiting Professor Seminar series



**Accurate Material Characterization over
THz Frequency Range**

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Date: 23 Nov 2023 (Thursday)

Time: 2:00 p.m.

Place: Rm 222, Ho Sin Hang Engineering Building, CUHK

Abstract

This presentation will begin with a general discussion on the current landscape of THz research and development. In particular, the state-of-the-art of MHz-through-THz material characterization will be briefly reviewed. Subsequently, two groups of free-space THz measurement techniques will be described for accurate material characterization and parametric extraction in connection with frequency independent optical paths. Quasi-optical mirror and lens systems are studied and developed over THz range to achieve precision complex permittivity measurements of dielectric substrates, films, and materials. To achieve a wide plane wave zone for the center of four-parabolic-mirror systems, two corrugated horns are designed and fabricated for the measurement systems. The Gaussicity of the corrugated horn is larger than 97.4%. For the proposed multiple reflection model and direct wave model, a set of closed-form expressions of loss tangent are derived from transmission parameters of the measurement systems. The resolution and uncertainty of loss tangent are examined according to the working frequency, the thickness of wafer or substrate, the real part of relative permittivity, and the transmission measurement uncertainty. The complex permittivity of Rogers/Duroid series PCB substrates, which are commonly used at microwave frequencies, and silicon wafers are measured over THz ranges.

Biography

Dr. Ke Wu is the Industrial Research Chair in Future Wireless Technologies and Professor of Electrical Engineering with the Polytechnique Montréal (University of Montreal), where he is also the Director of the Poly-Grames Research Center. He was the Canada Research Chair in RF and millimeter-wave engineering, the NSERC-Huawei Endowed Chair, and the Founding Director of the Center for Radiofrequency Electronics Research of Quebec. He has authored/co-authored over 1400 referred technical papers, and numerous books/book chapters and filed more than 80 patents. Dr. Wu was the principal initiator and organizer of many conferences and events including the General Chair of the 2012 IEEE MTT-S International Microwave Symposium (IMS – the largest IEEE annual conference), the TPC Co-Chair of the 2020 IEEE International Symposium on Antennas and Propagation (APS). He was the 2016 President of the IEEE Microwave Theory and Technology Society (MTT-S). He also served as the two-terms inaugural representative of the North America in the General Assembly of the European Microwave Association (EuMA). He was the recipient of many awards and prizes including the 2019 IEEE MTT-S Microwave Prize, the 2021 EIC Julian C. Smith Medal, 2022 IEEE MTT-S Outstanding Educator Award, and 2022 IEEE AP-S John Kraus Antenna Award. He was an IEEE MTT-S Distinguished Microwave Lecturer. Dr. Ke Wu is a Fellow of the IEEE, the Canadian Academy of Engineering, and the Academy of Science of the Royal Society of Canada, and the German National Academy of Science and Engineering (acatech).

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

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