

Millimeter – wave and Terahertz Applications Enabled by Photonics



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地點：明達館231室

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Biography:

Tadao Nagatsuma received B.S., M.S., and Ph.D. degrees in electronic engineering from Kyushu University, Fukuoka, Japan, in 1981, 1983, and 1986, respectively. From 1986 to 2007, he was with Nippon Telegraph and Telephone Corporation (NTT), Kanagawa, Japan. Since 2007, he has been with Osaka University, where he is currently a Professor with the Division of Advanced Electronics and Optical Science, Department of Systems Innovation, Graduate School of Engineering Science, and a Director of Co-Creative Education Division, Office for Industry-University Co-Creation. His research interests include millimeter-wave/terahertz electronics and photonics, and their applications to communications, sensing, and measurement. He is a Fellow of the IEEE, and a Fellow of the IEICE, Japan, and a Fellow of the Electromagnetics Academy of USA.

Abstract:

This lecture presents how effectively photonics technologies are implemented not only in generation, detection and transmission of millimetre waves (MMW) and terahertz (THz) waves, but also in system applications such as communications, measurements, spectroscopy and imaging to efficiently enhance their performance. After briefly reviewing key devices and components, first, wireless communications applications are discussed aiming at a data rate of terabit/s. Next, frequency-domain spectroscopy systems are presented, in particular focusing on the approach to increasing a measurement sensitivity, and a similar technique is successfully applied to visualization of MMW/THz electric-field radiation and propagation, which is crucial for the characterization of devices and systems. Finally, in order to make MMW/THz systems more compact and cost-effective, recent challenges in photonic integration technologies are described, which include monolithically integrated photonic signal generators, and hybrid integration schemes using, for example, photonic crystal platforms.

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