



香港城市大學
City University of Hong Kong

專業 創新 胸懷全球
Professional Creative
For The World



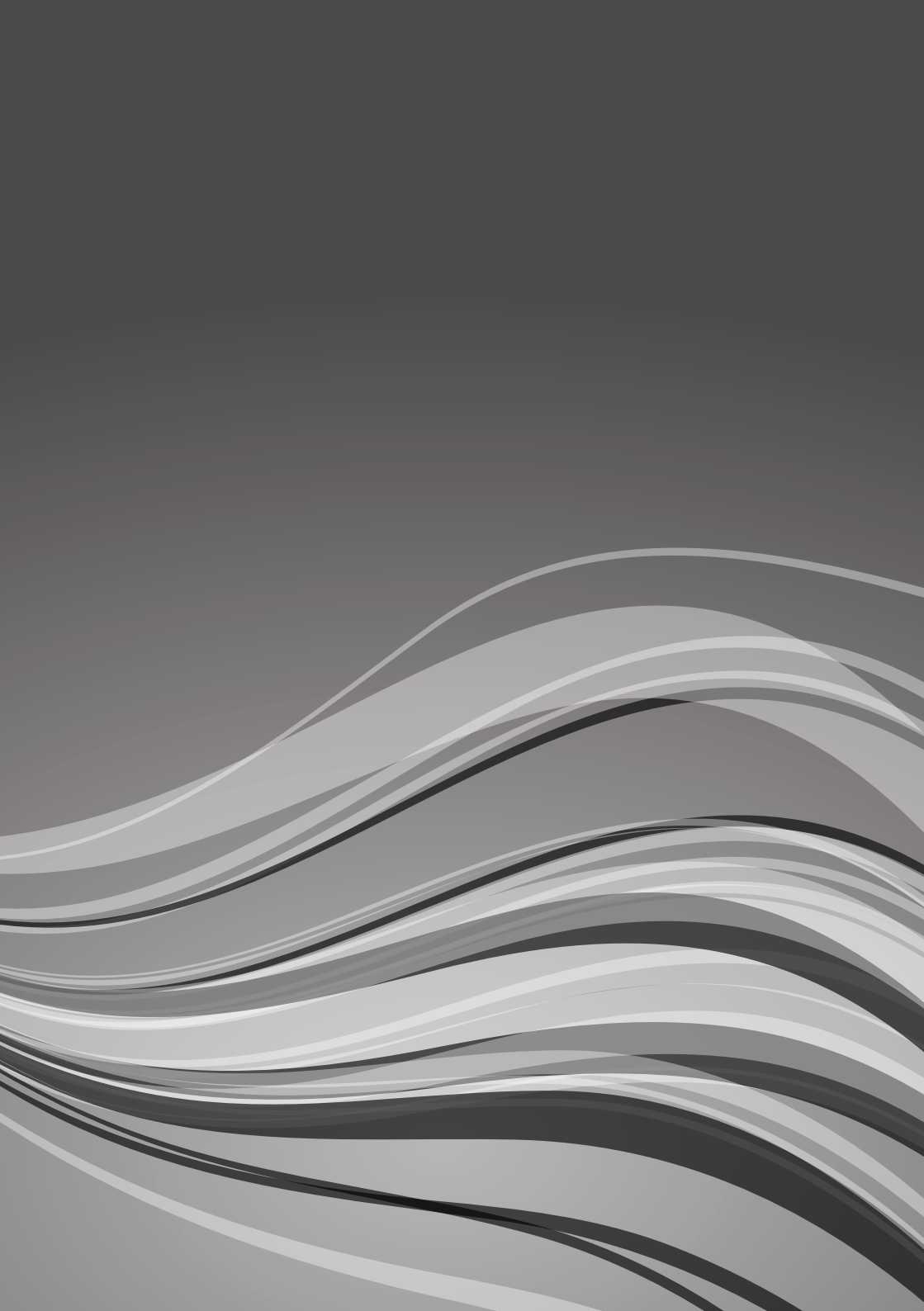
毫
米
波
State Key Laboratory of
Millimeter Waves

(香港城市大學特約實驗室)
(Partner Laboratory in City University of Hong Kong)

3-Day Short Course on Terahertz Technologies and Applications

14 – 16 June 2016

City University of Hong Kong



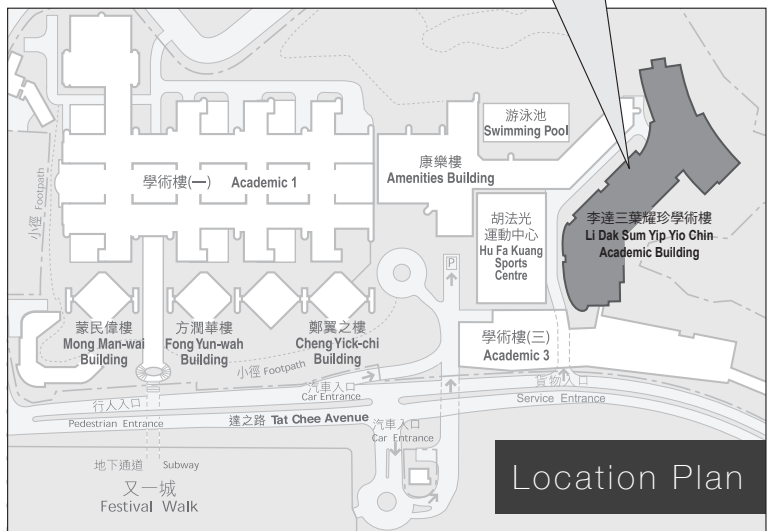
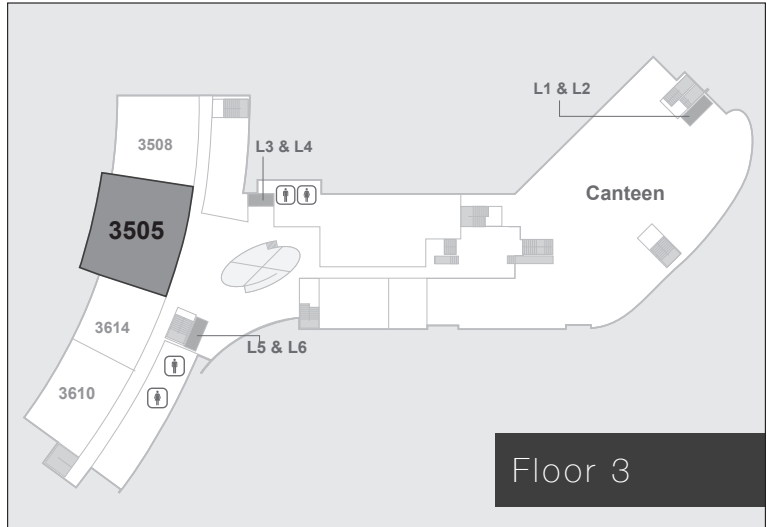
About the workshop

The 3-Day Short Course on Terahertz Technologies and Applications is organized by the State Key Laboratory of Millimeter Waves (Partner Laboratory in City University of Hong Kong), and will be held on 14 to 16 June 2016 at City University of Hong Kong.

The workshop aims to bring together world class THz researchers to share their knowledge and experiences, and to interact with participants. Other than lectures, participants will also be shown demonstrations of the use of CityU THz facilities, enabling better appreciation and understanding of THz technologies.

Venue

Room 3505, 3/F, Li Dak Sum Yip Yio Chin Academic Building,
City University of Hong Kong
Address: Tat Chee Avenue, Kowloon, Hong Kong SAR



Program

Tuesday, 14 June 2016

1400-1415	Opening Ceremony
1415-1515	Introduction to THz Science and Applications <i>Prof Peter H. Siegel</i>
1515-1535	Tea Break
1535-1635	Introduction to THz Science and Applications <i>Prof Peter H. Siegel</i>

Wednesday, 15 June 2016

0930-1030	A Novel Mechanism for Generation of Terahertz Radiation <i>Prof Shenggang Liu</i>
1030-1050	Tea Break
1050-1150	A Novel Mechanism for Generation of Terahertz Radiation <i>Prof Shenggang Liu</i>
1400-1500	THz System Integration <i>Dr Cyril Renaud</i>
1500-1520	Tea Break
1520-1620	THz System Integration <i>Dr Cyril Renaud</i>

Thursday, 16 June 2016

0930-1030	Discussion
1050-1150	Discussion
1400-1620	Lab Visit

Introduction to THz Science and Applications

Abstract: The Terahertz frequency regime, roughly spanning 300-3000 GHz, has moved to the forefront of recent expansion and innovative use of the RF spectrum. This short class will introduce the science and applications that gave rise to the field some 40 years ago, and review some of the more interesting application areas being pursued today. Particular attention will be devoted to cross-disciplinary investigations and the advantages and pitfalls facing those who wish to apply the technology to commercial enterprises.



Professor Peter H. Siegel
*California Institute of
Technology*

Biography: Peter H. Siegel (BA 1976, Astronomy, Colgate Univ., MS 1978, Physics, Columbia Univ., PhD, 1983, Electrical Eng., Columbia Univ.) has held appointments as Faculty Associate in Electrical Engineering and Senior Scientist in Biology at the California Institute of Technology; and Senior Research Scientist and Technical Group Supervisor for Submillimeter Wave Advanced Technology (SWAT) at the NASA Jet Propulsion Laboratory, both in Pasadena California. He has been working in the areas of millimeter and submillimeter-wave technology and applications for more than 40 years and has PI'd or co-I'd more than 75 R&D programs and been involved in delivering critical hardware for four major THz space flight instruments. He has published more than 300 articles in the THz field, and has given more than 200 invited talks in the U.S. and abroad on this subject. Among many other duties, Dr. Siegel is founding Chair, and now serves as elected General Secretary, of the International Society for Infrared, Millimeter, and Terahertz Waves (IRMMW-THz), the oldest and largest venue devoted to the field of far IR techniques, science and applications. He also served as founding Editor-in-Chief (since 2010) of the first major journal devoted exclusively to the topic of THz – the IEEE Transactions on Terahertz Science and Technology, which he brought from concept to an Impact Factor of 4.3 in only 3 years. Dr. Siegel has been an IEEE Distinguished Microwave Lecturer, co-Chair and Chair of MTT Committee 4–THz Technology, a TPC and Speaker's bureau member, an MTTs AdCom member for 5 years and an organizer and chair of seven special THz sessions at the IEEE International Microwave Symposia. His honors include more than 75 certificates of recognition for contributions to NASA, three-time recipient of the JPL Award for Excellence, the NASA Space Act Award, 10 NASA group achievement awards, and the IRMMW-THz Exceptional Service Award. He has been an IEEE Fellow since 2001 and currently runs THz Global, a small R&D company focused on RF-bio applications.

A Novel Mechanism for Generation of Terahertz Radiation

Abstract: Terahertz Science and Technology (THz) involves plenty of sciences and has many important applications in varieties of areas, Physics, Chemistry, Biology, Material Science, Electronics, etc. Therefore, THz has been paid extremely attention in all over the world. However, during past more than 30 years, the Gap of THz could not recovered.

After many years effort, scientists got to know that it is very hard to cover the THz band (0.1-10 THz, 1 THz =1000 GHz) only use the Electronics or only use the Photonics. A novel mechanism based on the combination of electronics and photonics has been presented. We show that by means of the Electron Beam exciting the Surface Plasmon Polaritons of some metals, like Silver (Ag) or Gold (Au), the coherent and tunable radiation from Light to UV can be obtained, and by using the Graphene sheet, the coherent and tunable coherent radiation covering the whole THz frequency band can be achieved. The newly expanding ideas will be given in the conclusion.

Biography: Shenggang Liu received his Ph. D. degree in physical electronics in 1958, he was elected the Academician of Chinese Academy of Sciences (CAS) in 1980 and he is now the member of Presidium of CAS. He is IEEE Fellow and member of Electromagnetic Academy, MIT, USA. He is the member of IOC of the IRMMW-THz Conference and the member of the K.J. Button Prize Committee. He was the Conference Chair of the International Conference on IRMMW in 2000, and the Honorary Conference Chair of the International Conference on IRMMW-THz in 2006. He is the Chair of IOC of the Shenzhen International Conference on Advanced Science and Technology.

He was awarded the K. J. Button prize in 2003, the Chinese National Prize of Nature Science in 1985 and in 1999. He was awarded The Tan Kah Kee Prize (the highest Prize of Chinese Academy of Sciences) in 2001. He was invited to serve as the nominator for Nobel Prize in Physics by the Nobel Committee for Physics of the Swedish Royal Academy of Sciences in the year of 1999 and 2000. He served as the president of University of Electronic Science and Technology of China (1986 to 2001).



Professor Shenggang Liu
*University of Electronic
Science and Technology*

THz System Integration

Abstract: It is now well known that the electromagnetic waves at frequencies from 300 GHz to 10 THz, the THz gap, offers a wide range of possible applications such as spectroscopy, sensing or wireless communications. To date many technological solutions have been proposed to answer the lack of sources and detectors within the THz gap with different level of success. It is notable that for many applications where THz is actually used the technology is still either bulky, power hungry or using cryogenic systems. In this lecture we will argue that to reach its potential the technology to be developed for THz needs to be integrated and work at room temperature. We will concentrate in particular on photonic technologies and their potential for integration. This will be done through a thorough look at the different photonic technologies used for THz generation and detection. This will then be followed by a discussion on the different current photonic integration solutions with a particular interest on the compromises required for each. We will finish the lecture with a look at some state of the art published work on integrated photonic solutions that could be applied or have been applied to the THz gap.



Dr. Cyril C. Renaud
University College London

Biography: Dr Cyril C. Renaud Received the degree of engineering from the Ecole Supérieure d'Optique, Orsay, France, and the Diplôme d'Etudes Approfondies (D.E.A.) in Optics and Photonics from the University Paris XI, Orsay, France, both in 1996. He spent one year as a project engineer with Sfim-ODS, working on the development of microchips lasers and portable range finders. He, then, joined the Optoelectronics Research Centre, University of Southampton, Southampton UK, in 1998, to work on diode pumped high-power ytterbium-doped fibre-lasers, with particular interest on Q-switched system and 980-nm generation. This work led to the award of a PhD in 2001. He is currently a Reader (Associate Professor) in Photonics at University College London, leading research on THz photonics with a particular interest on photonic integration and sensor system. He is also the UCL site director for the UCL/Cambridge doctoral training centre in Integrated Photonic and Electronic Systems Development. His work has led to over 120 publications in peer reviewed journals and international conferences, attracting over 1250 citations, and 3 patents.



