

Duration: 08:30 - 17:50

Room: Oslo

WTu-01

Terahertz Technologies: A Device and Application Prospective from Fundamentals to Implementations

Organisers:

Dimitris Pavlidis, Boston University & National Science Foundation, USA

Imran Mehdi, Jet Propulsion Laboratory (JPL), USA

Abstract

THz technology opens up new possibilities for various applications extending among other from sensing and spectroscopy to communications and imaging. While important advances have been made over the last two decades, THz technology can benefit from further developments in the area of devices, circuits and system implementation. This requires understanding of fundamentals, consideration of new device concepts and/or optimisation of their characteristics, hybrid or integrated approaches for circuit realisation and use of the knowledge obtained from such studies for system development. This workshop will bring together experts from various academic, national labs and commercial enterprises to discuss the most recent advances in their respective fields and to provide insight into what the future might hold for exploration of this frequency range. It will focus on a variety of materials such as traditional III-Vs, III-Nitrides, Silicon and Graphene, as well as various device concepts for efficient THz generation and detection. The operation of the components to be discussed is based on plasmonics, photoconductors, plasma waves, photomixing, Resonant Tunneling, Negative Differential Resistance and CMOS. Devices such as Quantum Cascade Lasers and Self-switching Diodes will also be addressed. The Workshop is intended for young scientists and engineers who are interested in learning about this emerging field, as well as individuals with a more advanced understanding of related concepts. The topics addressed include fundamental and engineering considerations together with the latest results in Terahertz technology.

Programme

08:30 - 09:05 THz Applications and Upcoming Space Missions

Imran Mehdi, Jet Propulsion Laboratory, USA

09:05 - 09:40 Fundamentals and Latest Results on Nitride-Based Two- and Three-Terminal Devices for Frequencies Extending to THz

Dimitris Pavlidis, Boston University, USA

09:40 - 10:10 Planar Nanodiodes for THz Detection and Mixing

Javier Mateos, University of Salamanca, Spain

10:10 - 10:50 Break

10:50 - 11:20 THz Oscillators Using Resonant Tunneling Diodes and Their Functions for Various Applications

Masahiro Asada and Safumi Suzuki, Tokyo Institute of Technology, Japan

11:20 - 11:55 Rare-Earth-Doped GaAs THz Sources Driven at 1550 nm

Elliott R. Brown, J.R. Middendorf, J.S. Cetnar, Wright State University, USA

11:55 - 12:30 THz Field Effect Transistor Detector Arrays for Postal Security Imaging Applications

Wojciech Knap, D. But, A. El Fatimy, P. Buzatu, O. Klimenko, N. Diakonova, Charles Coulomb Laboratory, Montpellier University & CNRS, Montpellier, France

12:30 - 13:50 Break

13:50 - 14:20 Graphene-Based THz Optoelectronics Devices

Berardi Sensale-Rodriguez, University of Utah, USA

14:20 - 14:55 High Performance THz Radiation Sources Based on Plasmonic Photoconductors

Mona Jarrahi, UCLA, USA

14:55 - 15:30 Photomixing mW THz Sources

Guillaume Ducourmau, P. Latzel, F. Pavanello, E. Peytavit, M. Zaknoute, J.-F. Lampin, IEMN, France

15:30 - 16:10 Break

16:10 - 16:40 Silicon-Based mm-Wave and THz Transceivers and On-Chip Antennas

Aydin Babakhani, Rice University, USA

16:40 - 17:15 THz Integrated Electronics Using Silicon Technologies

Ruonan Han, MIT, USA

17:15 - 17:50 Quantum Cascade Laser Based THz Signal Generation and Treatment

Manijeh Razeghi, Northwestern University, USA