

WORKSHOPS AND SHORT COURSES - FRIDAY

Duration: 09:00 to 13:00

Room: 15

WF07

Compact and High Performance Millimetre-Wave and THz Sources & Systems

Organisers

Edward Wasige, University of Glasgow
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Richard Hogg, University of Glasgow

Abstract

Europe is at the forefront of developing semiconductor-based millimetre-wave (mm-wave) and terahertz (THz) electronic and photonic technology platforms to address societal challenges, such as the ever-growing volume of data for mobile devices such as phones, laptops etc. which will soon require new ultra-broadband (multi-gigabit) wireless communications to easily and effectively access data-rich content, or for machine-to-machine communications as in data centres to handle the large volumes of data. Beyond communications, mm-wave/THz technologies can underpin imaging applications as required for inspection of concealed weapons or sensing applications as required in the identification of biological samples or chemical agents. Consequently, a host of technology options have been proposed for this frequency range, but those based on advanced semiconductor microwave monolithic integrated circuits (MMICs) and on resonant tunnelling diodes (RTDs) are being actively developed.

This workshop will discuss the RTD technology being developed on iBROW (<http://ibrow-project.eu>), a Horizon 2020 project on front-ends for short-range multi-gigabit wireless links and microwave-photonic interfaces for seamless links to the optical fibre backbone network. The discussions will be underpinned by an industrial perspective from an end-user, especially with regards to technical specifications as well as commercial considerations for future practical mm-wave/THz systems. Latest state-of-the-art results on RTD technology by other researchers including ~2 THz oscillators and on the manufacturability of low-cost tunnelling devices will also be presented. Finally, results from other European projects TWEETHER (<http://tweether.eu>) & M3TERA (<https://m3tera.eu>) will also be presented. TWEETHER is developing a travelling-wave-tube based W-band technology for a transmission hub for point to multipoint wireless distribution with high capacity, while M3TERA is developing a micromachined (silicon) platform for the heterogeneous integration of terahertz components to enable high data rate short range wireless communications



Programme

09:00 – 09:10	Welcome
09:10 - 09:40	Perspectives for Commercialisation of RTDs in high Performance mm-Wave Transceivers Wolfgang Templ and Andreas Pascht, Nokia Bell Labs, Germany
09:40 - 10.00	Resonant Tunnelling Diode Technology for mm-Wave and THz Applications Edward Wasige, University of Glasgow, United Kingdom
10.00 - 10.20	Resonant Tunnelling Diode Microwave Photonics Interface for Wireless Communications José M. L. Figueiredo, Universidade do Algarve, Portugal
10.20-10.40	Ultra-Broadband RTD Based Wireless Communications Luís Pessoa, INESC - Instituto de Engenharia de Sistemas e Computadores, Porto, Portugal
10:40 - 11:20	Coffee Break
11.20 - 11.40	Resonant-Tunnelling-Diode THz Oscillators and Applications: Structures for High Frequency, High Output Power, and High Functionality Masahiro Asada and Safumi Suzuki, Tokyo Institute of Technology, Japan
11.40 - 12.00	Low Cost Manufacturing of RTD and ASPAT Tunnel Diodes for mm-Wave/THz Applications Mohamed Missous, University of Manchester, United Kingdom
12.00 - 12.20	H2020 TWEETHER Project for Wireless Communications at W-band Viktor Krozer, Goethe University of Frankfurt, Germany
12.20-12.40	H2020 M3TERA Project- Micromachined THz systems Joachim Oberhammer, KTH Royal Institute of Technology, Sweden
12:40 - 13:00	mm-wave/THz Technologies for Wireless Communications: What Challenges and Which Solutions? Open Discussion and Concluding Remarks Peter Cain, Keysight Technologies

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