Session 22 Overview:
Terahertz for Communication and Sensing

WIRELESS SUBCOMMITTEE

Session Chair:
Q. Jane Gu
University of California, Davis, CA

Session Co-Chair:
Byung-Wook Min
Yonsei University, Seoul, Korea

Session Moderator:
Maryam Tabesh
Google, Mountain View, CA

With the continuing advancements of THz technologies in silicon processes, this year's papers further push the technique frontiers in circuit performances and system demonstrations. This session features four THz papers describing THz Prism for spectrum-to-space mapping, 300GHz wideband communication, a 0.42THz coherent transceiver for phase-contrast imaging, and a phase-processing-based micrometer-range-resolution radar at 250GHz.

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8:30 AM

22.1 THz Prism: One-Shot Simultaneous Multi-Node Angular Localization Using Spectrum-to-Space Mapping with 360-to-400GHz Broadband Transceiver and Dual-Port Integrated Leaky-Wave Antennas

Hooman Saeidi, Princeton University, Princeton, NJ

In Paper 22.1, Princeton University demonstrates THz Prism: one-shot simultaneous multi-node angular localization using spectrum-to-space mapping and dual-port integrated leaky-wave antennas in 65nm CMOS. A one-shot direction-finding across 1D with an accuracy of 0.95deg and 2.1deg with an integration time of 5ms and 50µs respectively is demonstrated.

8:38 AM

22.2 A 300GHz-Band Phased-Array Transceiver Using Bi-Directional Outphasing and Hartley Architecture in 65nm CMOS

Ibrahim Abdo, Tokyo Institute of Technology, Tokyo, Japan

In Paper 22.2, Tokyo Institute of Technology and NTT present a 300GHz phased-array transceiver using outphasing and Hartley architecture in 65nm CMOS. This work demonstrates the first implementation of a wideband CMOS phased-array transceiver that operates at a frequency higher than 200GHz.

8:46 AM

22.3 A 0.42THz Coherent TX-RX System Achieving 10dBm EIRP and 27dB NF in 40nm CMOS for Phase-Contrast Imaging

Dragan Simic, KU Leuven - MICAS, Leuven, Belgium

In Paper 22.3, KU Leuven presents a 0.42THz coherent TX-RX system for phase-contrast imaging implemented in 40nm CMOS, achieving 52dB SNR (100kHz RBW) at 25cm distance thanks to the 10dBm EIRP TX and the 27dB NF RX.

8:54 AM

22.4 A 250GHz Autodyne FMCW Radar in 55nm BiCMOS with Micrometer Range Resolution

S. M. Hossein Naghavi, University of Michigan, Ann Arbor, MI

In Paper 22.4, the University of Michigan and STMicroelectronics report a 250GHz autodyne FMCW radar in 55nm BiCMOS with micrometer-range resolution using a phase processing method. With +17dBm maximum TX EIRP and 66.7GHz bandwidth, a range resolution of 54µm is achieved for targets at 25.4cm distance, with an overall measured range error better than 0.025%.