

Cover Letter for the Special Issue on THz Communications

Thomas Kürner

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THz communications has made significant progress over the last years. Whereas propagation studies and general considerations of system characteristics have been in the focus in the first years of this emerging new research area, enabling transmitter and receiver technologies have been developed recently in various research laboratories all over the world. These advances have drawn the attention of the industry and yield to the formation of the IEEE 802.15 Task Group 3d targeting a standard for 100 Gbps switched point-to-point links including physical layer solutions around a carrier frequency around 300 GHz. This special issue on THz communications consists of 7 invited contributions, which are enumerated below. These contributions can be considered as a representative cross-section of ongoing research in this area.

1. *THz-TDS Characterization of the Digital Communication Channels of the Atmosphere and the Enabled Applications* by Y. Yang, M. Mandehgar and D. Grischkowsky from Oklahoma State University (United States) provide measurements and linear dispersion theory calculations for digital THz ground links.
2. *Experimental Comparison of Terahertz and Infrared Signaling in controlled atmospheric Turbulence* by J. Ma, J. F. Federici from the New Jersey Institute of Technology (United States) and L. Moeller from Bell Laboratories/Alcatel Lucent (United States) presents a comparison of numerical simulations and experiments of IR and THz attenuation under different turbulence conditions.
3. *Measurements and Modeling of Basic Propagation Characteristics for Intra-Device Communications at 60 GHz and 300 GHz* by T. Kürner, A. Fricke, S. Rey from Technische Universität Braunschweig (Germany), P. Le Bars, M. Achir from Canon Research Center France (France) and T. Kleine-Ostmann from Physikalisch-Technische Bundesanstalt (Germany) describes propagation investigations targeting ultra-high data-rate wireless links inside devices.
4. *Ultrahigh-Bitrate Wireless Data Communications via THz-Links: Possibilities and Challenges* by T. Schneider from Technische Universität Braunschweig (Germany) describes a method for the generation of very stable and precise millimeter and THz waves.
5. *Coherent Terahertz Wireless Signal Transmission using advanced Optical Fiber Communication Technology* by A. Kanno, T. Kuri, I. Morohashi, I. Hosako, T. Kawanishi from

T. Kürner (✉)
Institut für Nachrichtentechnik, THz Communications Lab, Technische Universität Braunschweig,
Schleinitzstr. 22, 38092 Braunschweig, Germany
e-mail: t.kuerner@tu-bs.de

- NICT (Japan), Y. Yoshida and K. Kitayama from Osaka University (Japan) demonstrates multilevel modulation and demodulation applicable as a high-speed wireless transmission link directly connected to an optical fiber network.
6. *THz Communications using Photonics and Electronics Devices: the Race to Data-Rate* by G. Ducournau, P. Szriftgiser, F. Pavanello, E. Peytavit, M. Zaknoute, D. Bacquet, A. Beck, T. Akalin and J.F. Lampin from Université de Lille (France) presents the design of a photonic-based THz emitter and its applications to communication links at 200, 400 and 600 GHz.
 7. *64 Gbit/s Transmission over 850m Fixed Wireless Link at 240 GHz Carrier Frequency* by I. Kallfass, F. Boes, T. Messinger, J. Antes from Universität Stuttgart (Germany), A. Inam from Fujitsu Semiconductor Europe GmbH (United Kingdom), U. Lewark from Karlsruher Institute of Technology (Germany), A. Tessmann from Fraunhofer Institute of Applied Solid State Physics in Freiburg (Germany) and R. Henneberger from Radiometer Physics in Meckenheim (Germany) demonstrates a successful multi-gigabit transmission based on monolithic integrated circuits and 64 GSa/s ADC and DAC boards.