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Special Issue Reprint

Broadband Terahertz Devices and Communication Technologies

www.mdpi.com/books/reprint/7327

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ISBN 978-3-0365-7743-2 (Hardback)
ISBN 978-3-0365-7742-5 (PDF)



The remarkable explosion of wireless devices and bandwidth-consuming Internet applications has boosted the demand for wireless communications with ultra-high data rates. The wireless traffic volume is foreseen to match or even surpass the wired services by 2030, and high-precision wireless services will need to be guaranteed with a peak data rate of well beyond 100 Gbit/s, eventually reaching 1 Tbit/s. To meet the exponentially increasing traffic demand, new regions in the radio spectrum are being explored. The terahertz band, which is sandwiched between microwave frequencies and optical frequencies, is considered the next breakthrough point to revolutionize communication technology due to its rich spectrum resources. It is recognized as a promising candidate for future rate-greedy applications, such as 6G communications. At the World Radio Communication Conference 2019 (WRC-19), it was announced that the identification of frequency bands in the frequency range of 275 GHz–450 GHz is permitted for land-mobile and fixed service applications, indicating potential standardization of the low-frequency window of terahertz band for near-future wireless communications. Motivated by the potential of terahertz wireless communications, this reprint reports on recent critical technological breakthroughs in terms of broadband terahertz devices and communications, as well as novel technologies at other frequency bands that can also motivate terahertz research.



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