

Active Integrated Circuits for Terahertz Communication

Abstract

Active integrated circuits based on modern semiconductor technologies are today entering the submillimeter-wave frequency range, where they enable compact and high performance analog transceiver frontends. The presentation highlights the state-of-the-art in electronic transmitters and receivers dedicated to multi-Gigabit wireless communication. A fully MMIC-based broadband wireless link operating at 240 GHz is presented and data transmission experiments with data rates up to 40 Gbit/s are discussed. By combining the electronic receiver with a high linearity photonic transmitter, the transmission of 100 Gbit/s was demonstrated. The talk also aims at discussing the prospects and challenges of the application scenarios of Terahertz communication and concludes with an overview of the current routes of development.

Short Biography

Ingmar Kallfass received the Dipl.-Ing. degree in Electrical Engineering from University of Stuttgart in 2000, and the Dr.-Ing. degree from University of Ulm in 2005. In 2001, he worked as a visiting researcher at the National University of Ireland, Dublin. In 2002, he joined the department of Electron Devices and Circuits of University of Ulm as a teaching and research assistant. In 2005, he joined the Fraunhofer Institute for Applied Solid-State Physics with a focus on nonlinear millimeter-wave integrated circuit design. From 2009 to 2012, he was a professor at the Karlsruhe Institute of Technology in the field of high-speed integrated circuits in a shared professorship with the Fraunhofer IAF in the frame of the German Excellence Initiative. Since 2013, he holds the newly established chair for Robust Power Semiconductor Systems at the University of Stuttgart as part of the Robert Bosch Center for Power Electronics.