T-KOS: Terahertz Technology for Reliable Communication

Taking part in a virtual meeting while traveling by train – no problem if there are no gaps in the mobile network. Mobile working underscores the importance of stable data connections. This applies equally to industrial production, which is relying more and more on networked components. Our "Materials Characterization and Testing" department is researching how terahertz technology can additionally optimize the integration of assemblies through improved sensor technology.

The requirements for communication networks and sensor solutions in industrial production processes are growing, which is why the German Federal Ministry of Education and Research (BMBF) launched the T-KOS project (Terahertz Technologies for Future-Oriented Innovations in Communication and Sensor Technology) in 2021. In the project, terahertz technology is now being developed synergistically for industry in the fields of "communication" and "sensor technology" for the first time.

Working together to achieve compact system concepts

T-KOS is a joint project of "Forschungsfabrik Mikroelektronik Deutschland "and Fraunhofer ITWM. It bundles the commitment of ten cooperation partners. The researchers are developing demonstrators for wireless communication with high bit rates and industrial measurement technology based on high-frequency electronics and terahertz photonics.

One promising way to increase data capacity at carrier frequencies above 100 GHz is terahertz radio technology. The higher the carrier frequency, the greater the usable bandwidth and thus the data capacity. This means that smaller antenna elements are needed and compact radio systems can be realized with a large number of active antennas. This is an advantage that also benefits industrial terahertz measurement technology, which is used for imaging and testing.

Demonstrators for imaging Terahertz testing

"Electronic and photonic system concepts in the terahertz range are conceptually close to each other," says Dr. Fabian Friederich, coordinator of the T-KOS activities at Fraunhofer ITWM. "Thanks to our expertise and our good laboratory equipment, we can realize demonstrators for both branches of technology in Kaiserslautern for imaging terahertz testing in production processes." While the all-electronic demonstrator aims to provide industrial-grade inline measurement technology with millimeter resolution on the production line, the photonic concept serves as a research platform for future developments towards higher frequencies and improved resolution.

www.itwm.fraunhofer.de/terahertz-testing

T-KOS
Terahertz-Technologien für Kommunikation und Sensorik

Contact

Dr. Fabian Friederich
Group Manager "Electronic Terahertz Measurement ETM"
Phone +49 631 31600-4908
fabian.friederich@itwm.fraunhofer.de