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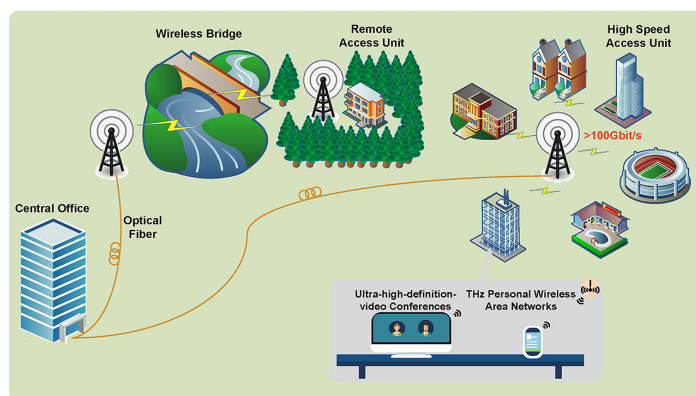
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A new system for high-speed terahertz wireless communication

Chris Patrick

Experimental demonstration of wireless transmission beyond 100 Gbit/s brings terahertz wireless communication closer to high-speed wireless applications.



Increased demand for wireless communication will push the required wireless connection speed beyond 100 Gbit/s. To deliver the broad bandwidth necessary for future communication, researchers are exploring new frequency resources, such as terahertz (THz) wireless communication, which is defined as more than 300 gigahertz (GHz).

Wang et al. built a high-speed photonic wireless communication system operating at 350 GHz based on radio-over-fiber. Their THz wireless communication system demonstrated transmission data rates of more than 100 Gbit/s over a 10 km fiber and 26.8-m THz wireless link without using any THz amplifiers.

The authors enhanced the bit energy efficiency by combining orthogonal frequency division multiplexing, a type of digital transmission, with the modulation scheme known as probabilistic-shaped 16-ary quadrature amplitude modulation, plus highly directive antennas and advanced digital signal processing techniques.

“Our achievement reveals the potential of THz-over-fiber technology in supporting THz wireless communication, which will most likely play a very important role in the era beyond 5G and 6G,” said author Xianbin Yu.

These results bring THz wireless communication a step closer to high-speed wireless applications. However, reaching the next generation of THz wireless systems will first require tackling many challenges, such as finding techniques to precisely control the THz beam and honing in on a strategy for energy efficient transmission. Next, the team plans to work toward building a THz photonic wireless communication system capable of Tbit/s transmission.

Source: “26.8-m THz wireless transmission of probabilistic shaping 16-QAM-OFDM signals,” by Shiwei Wang, Zijie Lu, Wei Li, Shi Jia, Lu Zhang, Mengyao Qiao, Xiaodan Pang, Nazar Idrees, Muhammad Saqlain, Xiang Gao, Xiaoxiao Cao, Changxing Lin, Qiuyu Wu, Xianmin Zhang, and Xianbin Yu, *APL Photonics* (2020). The article can be accessed at <https://doi.org/10.1063/5.0003998>.

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