Abstracts

Application of near-field optical-fiber probes to millimeter-wave optical heterodyne

Seok Kil Han, M.E. Ali, Sang-Dong Jung, Kwang-Yong Kang and H.R. Fetterman. "Application of near-field optical-fiber probes to millimeter-wave optical heterodyne." 1999 Transactions on Microwave Theory and Techniques 47.7 (Jul. 1999, Part II [T-MTT] (Special Issue on Microwave and Millimeter-Wave Photonics)): 1381-1384.

We demonstrate the use of near-field fiber-optic probes in optical heterodyne characterization of high-speed devices. The submicrometer-size optical beam obtained from the fiber-optic probe was employed to selectively excite a tiny area of the device active region. Optical heterodyne measurements on heterojunction bipolar transistors were conducted at 1.3 /spl mu/m with a difference frequency of 60 GHz. Significant response of the device with a signal-to-noise ratio of 25 dB was observed. The dc and ac photoresponse was also measured as a function of the distance between the fiber probe and the device-under-test. The data clearly showed distinguishable regimes of near- and far-field operation. The near-field high-frequency optical heterodyne technique as explored in this paper provides us with new capabilities that can be effectively utilized in the field of optical millimeter-wave interaction in ultrafast devices.

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