Abstracts

Highly tunable fiber-coupled photomixers with coherent terahertz output power

S. Verghese, K.A. McIntosh and E.R. Brown. "Highly tunable fiber-coupled photomixers with coherent terahertz output power." 1997 Transactions on Microwave Theory and Techniques 45.8 (Aug. 1997, Part II [T-MTT]): 1301-1309.

Low-temperature-grown (LTG) GaAs is used as an optical-heterodyne converter or photomixer, to generate coherent continuous-wave (CW) output radiation at frequencies up to 5 THz. Photomixers consist of an epitaxial LTG-GaAs layer that is patterned with interdigitated metal electrodes, on which two laser beams are focused with their frequencies offset by the desired difference frequency. The difference-frequency power is coupled out of the photomixer using coplanar waveguide at low frequencies and using log-spiral, dipole, and slot antennas at higher frequencies. Difference-frequency power is limited by the maximum optical-pump power that the photomixer can withstand. Fiber-coupled photomixers were operated at 77 K-a configuration in which they exhibited improved heatsinking and, therefore, withstood higher pump power. Progress has been made in the development of photomixer local oscillators (LOs) for space-based receivers that use superconducting tunnel junctions and hot-electron bolometers as heterodyne detectors.

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