Abstracts

Optical Generation of Millimeter-Wave Signals for Fiber-Radio Systems Using a Dual-Mode DFB Semiconductor Laser

D. Wake, C.R. Lima and P.A. Davies. "Optical Generation of Millimeter-Wave Signals for Fiber-Radio Systems Using a Dual-Mode DFB Semiconductor Laser." 1995 Transactions on Microwave Theory and Techniques 43.9 (Sep. 1995, Part II [T-MTT] (Special Issue on Microwave and Millimeter Wave Photonics)): 2270-2276.

This paper presents a new approach to the optical generation of millimeter-wave signals using a dual-mode multisection distributed feedback semiconductor laser. This simple device is capable of generating high power signals between 40 and 60 GHz with extremely high spectral purity and stability. The two optical modes produced by this laser are heterodyned on an ultrafast photodiode to give a beat signal at the mode difference frequency. The phase noise of the beat signal is greatly reduced by phase-locking the modes using an electrical drive signal applied to the laser at a subharmonic of the beat frequency. Millimeter-wave signals are obtained with a linewidth of less than 10 Hz, a phase noise of less than - 85 dBc/Hz at 100 kHz offset, and a locklng range of about 500 MHz. Millimeter-wave fiber-radio systems are seen as a major application area for these new compact optical sources.

❑ Return to main document.