Abstracts

Performance of a 1.2 THz frequency tripler using a GaAs frameless membrane monolithic circuit

A. Maestrini, J. Bruston, D. Pukala, S. Martin and I. Mehdi. "Performance of a 1.2 THz frequency tripler using a GaAs frameless membrane monolithic circuit." 2001 MTT-S International Microwave Symposium Digest 01.3 (2001 Vol. III [MWSYM]): 1657-1660 vol.3.

The first ever planar Schottky diode multiplier working over a THz will be presented in this paper. A tunerless 1.2 THz waveguide frequency tripler has been designed, fabricated and tested. The frequency multiplier consists of a 3 micron-thick GaAs frameless-membrane monolithic circuit, mounted in a split waveguide-block, which includes a built-in Picket-Potter horn. The 1.2 THz membrane tripler is driven by a 400 GHz solid-state chain composed of HEMT based power amplifiers followed by two tunerless planar diode frequency doublers. At room temperature, output power up to 80 microwatts was measured at 1126 GHz with a peak-efficiency of 0.9% and a 3 dB bandwidth of about 3.5%. The output power of the multiplier chain increased dramatically with a decrease of the ambient temperature-up to 195 microwatts was measured at 120 K. When further cooled to 50 K the chain delivers power levels as high as 250 microwatts. To the best of our knowledge, this is the first demonstration of a fully planar multiplier chain at these frequencies, along with performance that supercedes current state-of-the-art performance of whisker-contacted sources.

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