

Abstracts

An all solid-state 640 GHz subharmonic mixer

I. Mehdi, P.H. Siegel, D.A. Humphrey, T.H. Lee, R.J. Dengler, J.E. Oswald, A. Pease, R. Lin, H. Eisele, Ralph Zimmermann and N. Erickson. "An all solid-state 640 GHz subharmonic mixer." 1998 MTT-S International Microwave Symposium Digest 98.2 (1998 Vol. II [MWSYM]): 403-406.

This paper reports on the first all solid-state two-diode subharmonically pumped (SHP) mixer operating at 640 GHz. The required local oscillator (LO) power is less than 4 mW at 320 GHz for optimum performance. Two approaches are used to generate the required LO power. The first approach utilizes a 107 GHz InP Gunn diode followed by a whisker-contacted tripler while the second employs an IMPATT diode at 80 GHz followed by two planar diode frequency doublers. The best measured mixer noise temperature is 2500 K double sideband with a conversion loss of 9 dB at an IF of 2 GHz. An IF-frequency scan of the mixer shows a noise temperature of no worse than 3700 K across the 1.5 to 15 GHz band. Extraneous LO noise from the IMPATT is not evident for the SHP mixer, even at those frequencies and with low IF's. This performance represents the state-of-the-art for room temperature subharmonic mixers operating at these frequencies. The mixers are being developed for NASA's Mission to Planet Earth.

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