Abstracts

Superconducting Bolometric Mixers

H. Ekstrom, B. Karasik, E. Kollberg and S.K. Yngvesson. "Superconducting Bolometric Mixers." 1994 Microwave and Guided Wave Letters 4.7 (Jul. 1994 [MGWL]): 253-255.

Mixing at 20 GHz in niobium superconducting thin-film strips in the resistive state is studied. Experiments give evidence that electron-heating is the main cause of the nonlinear phenomena. The requirements on the mode of operation and on the film parameters for small conversion loss and the possibility of conversion gain are discussed. Measurements indicate a conversion loss between 1-8 dB and a DSB mixer noise temperature between 100 and 450 K at 20 GHz. The device output noise temperature at the mixer operating point can be as low as 30-40 K. A simple theory that is based on the assumption that the small signal resistance is linearly dependent on power is presented. This type of mixer is considered very promising for use in low-noise heterodyne receivers at THz frequencies.

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