Abstracts

Optoelectronic mixing, modulation, and injection locking in millimeter-wave self-oscillating InP/InGaAs heterojunction bipolar photo transistors-single and dual transistor configurations

J. Lasri, A. Bilenca, G. Eisenstein and D. Ritter. "Optoelectronic mixing, modulation, and injection locking in millimeter-wave self-oscillating InP/InGaAs heterojunction bipolar photo transistors-single and dual transistor configurations." 2001 Transactions on Microwave Theory and Techniques 49.10 (Oct. 2001, Part II [T-MTT] (Special Issue on Microwave and Millimeter-Wave Photonics)): 1934-1939.

We describe an experimental investigation of two millimeter-wave oscillators one employing a single and the other using two InGaAs/InP heterojunction bipolar photo-transistors (photo-HBTs). The single HBT oscillator can be optically injection locked to improve its spectral purity. Alternatively, it can be modulated by analog or digital data carried by an optical signal. In the two phototransistors case, one HBT oscillates and is optically injection locked while the second serves as a modulator. The two-transistor case proved to be superior in terms of carrier spectral purity, analog modulation efficiency and linearity as well as for digital modulation. Its advantages stem from the better isolation between the local oscillator and modulating signals and from the ability to separate the injection-locking and modulation functions.

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