Abstracts

100-300 GHz Gunn Oscillator Simulation through Harmonic Balance Circuit Analysis Linked to a Hydrodynamic Device Simulator

M.F. Zybura, S.H. Jones, G.B. Tait and J.R. Jones. "100-300 GHz Gunn Oscillator Simulation through Harmonic Balance Circuit Analysis Linked to a Hydrodynamic Device Simulator." 1994 Microwave and Guided Wave Letters 4.8 (Aug. 1994 [MGWL]): 282-284.

Accurate and efficient calculations of the large-signal AC behavior of second-harmonic InP Transferred Electron Oscillators (TEO's) are presented. This is accomplished by combining a novel harmonic balance circuit analysis technique with a hydrodynamic device simulator employing the temperature dependent drift and diffusion equations. The electron transport simulations include a detailed heat flow analysis to update the temperature profile in the device. The nonlinear circuit analysis utilizes a fixed-point iterative method derived from the robust multiple reflection algorithm. To expedite the process and aid in convergence, an acceleration technique is also employed in this algorithm. The associated reduction in computation time allows for the inclusion of a hydrodynamic treatment of the Transferred Electron Device (TED) using the modified drift and diffusion equations. Comparisons are made with the published experimental data reported by Rydberg on second-harmonic 188 GHz InP TEO's.

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