Abstracts

Field Theory Analysis of Distributed Microwave Effects in High Speed Semiconductor Lasers and Their Interconnection with Passive Microwave Transmission Lines

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This paper present a rigorous field theory analysis of the distributed microwave effects in high speed semiconductor lasers by using a combination of a self-consistent complex finite difference method with the frequency-domain TLM method (FDTLM). The semiconductor laser is treated as a lossy multilayer slow-wave rnicrostrip transmission line. The conductivity profile in the active layer is obtained by a self-consistent solution of the nonlinear semiconductor device equations. The attenuation factor, phase velocity and characteristics impedance of the semiconductor laser is presented for the unbiased and forward-biased case and compared with experimental results. On the basis of this analysis we present the interconnection effects between passive microwave transmission lines and laser diodes using airbridge or flip-chip transitions.

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