Abstracts

Leaky Wave Radiation from a Periodically Photoexcited Semiconductor Slab Waveguide

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This paper presents investigations on leaky wave antenna that are modeled by periodical illumination of light on a grounded semiconductor slab waveguide using an asymptotic method of singular perturbation procedure based on multiple scales. Analytical results clearly show that the periodical illumination strongly affects the radiation characteristics such as efficiency and the radiation angle. The dominant effects are studied quantitatively and are outlined in the performance diagrams as a function of optically induced plasma density and the grating period. Initial experimental results at Q band using silicon slab guide under an array of 820-nm LED CW excitation are also reported and are in relatively good agreement with the theory.

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