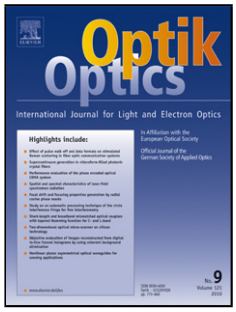

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A simplified modal expansion formalism adapted to the optical design of resonant cavity enhanced photodetectors using metallic gratings

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Abstract

In this communication, we present a method to model the light absorption in a resonant photoconductor based on a photoconductive layer sandwiched between a metallic grating in front side and a metallic backside mirror. We started from a modal expansion formalism previously developed in order to model the transmission and the reflection of an infinite array of holes and we added the effect of a stack of homogeneous layers ended by a metallic mirror. It is finally shown that the electromagnetic response of the structure calculated with this numerical method is in good agreement with a more rigorous method such as the rigorous coupled wave analysis, whereas it requires a much lower computing power.

Keywords: `Ultrafast Photodetector, Modal expansion analysis, Diffraction Gratings`

2010 MSC: 00-01, 99-00

1. Introduction

Ultrafast photodetectors are key devices for the generation and the detection of THz waves based on the laser and optoelectronics technologies[1],[2]. As far as now, the devices which present suitable properties for these applications,

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