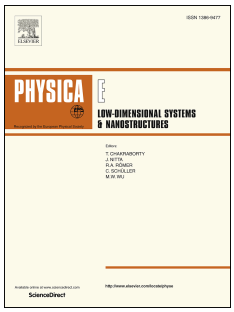
Accepted Manuscript



A quantum rings based on multiple quantum wells for 1.2–2.8□THz detection

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PII: S1386-9477(17)32002-7

DOI: 10.1016/j.physe.2018.04.012

Reference: PHYSE 13106

To appear in: *Physica E: Low-dimensional Systems and Nanostructures*

Received Date: 31 December 2017

Revised Date: 9 April 2018

Accepted Date: 9 April 2018

Please cite this article as: A. Mobini, M. Solaimani, A quantum rings based on multiple quantum wells for 1.2–2.8□THz detection, *Physica E: Low-dimensional Systems and Nanostructures* (2018), doi: 10.1016/j.physe.2018.04.012.

A Quantum Rings Based on Multiple Quantum Wells for1.2-2.8 THz Detection

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Abstract

In this paper optical properties of a new QR based on MQWs have been investigated for detection in the THz range. The QR composed of a periodic effective quantum sites that each one considered as QW in theta direction. Using Tight binding method, eigen value problem for a QR with circumstance of 100 nm number with different number of wells i.e. 2, 4, 6 and 8 are solved and the absorption spectrum have been calculated. The results show that absorption has maximum value in range of (1.2-2.88 THz) that can be used for THz detection. Finally, it is realized that by increasing the number of wells, the numbers of absorption line also increase.

Key Words: Terahertz optical devices, Quantum ring-Quantum Wells, Tight binding method.

1. Introduction

Terahertz (THz) detection has created a great deal of interest for researchers because it has many industrial and technological applications including, biomedical imaging, quality control, sub-millimeter astronomy and security applications [1-4].

In this field, different effects and structures like Bolometers or extrinsic photo-detectors, based on Ge, Si, or InSb, semiconductor-based quantum dots (QDs) and Quantum rings that fabricated