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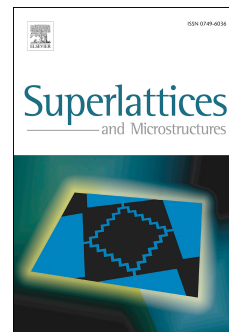
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# Optically detected electrophonon resonance in quantum wells via two-photon absorption processes under the influence of phonon confinement

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## Abstract

The multi-photon (nonlinear) optical absorption power by electrons in square quantum wells, taking account the electron-confined optical phonon interaction, is calculated using the state-dependent projection technique. We numerically obtain the dependence of the absorption power on the photon energy in the GaAs/AlAs semiconductor quantum well. By analysing this dependence, we show clearly the transition corresponding to each resonant peak, including the optically detected electrophonon resonance (ODEPR). Also, using a computational method, we obtain the line-width of the ODEPR as profiles of the curves. The dependence of the ODEPR line-width on the width of the quantum well shows that the ODEPR line-width for two-photon absorption is about one order of value smaller than it is for one-photon absorption.

*Keywords:* Absorption line-width, nonlinear optical absorption, quantum well, electrophonon resonance, phonon confinement.

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## 1. Introduction

The two-photon absorption is a nonlinear process in which two photons of identical or different frequencies are simultaneously absorbed by the same

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