

## Accepted Manuscript

Second and third harmonic generation associated to infrared transitions in a Morse quantum well under applied electric and magnetic fields

R.L. Restrepo, E. Kasapoglu, S. Sakiroglu, F. Ugan, A.L. Morales, C.A. Duque

PII: S1350-4495(17)30159-7  
DOI: <http://dx.doi.org/10.1016/j.infrared.2017.06.005>  
Reference: INFPHY 2315

To appear in: *Infrared Physics & Technology*

Received Date: 22 March 2017  
Revised Date: 27 May 2017  
Accepted Date: 7 June 2017

Please cite this article as: R.L. Restrepo, E. Kasapoglu, S. Sakiroglu, F. Ugan, A.L. Morales, C.A. Duque, Second and third harmonic generation associated to infrared transitions in a Morse quantum well under applied electric and magnetic fields, *Infrared Physics & Technology* (2017), doi: <http://dx.doi.org/10.1016/j.infrared.2017.06.005>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.



transitions in a Morse quantum well under applied electric and  
magnetic fields

R. L. Restrepo<sup>1</sup>, E. Kasapoglu<sup>2</sup>, S. Sakiroglu<sup>3</sup>, F. Ungan<sup>4</sup>, A. L. Morales<sup>5</sup>, C. A. Duque<sup>5</sup>

<sup>1</sup>*Universidad EIA, C.P. 055428 Envigado, Colombia*

<sup>2</sup>*Cumhuriyet University, Physics Department, 58140 Sivas, Turkey*

<sup>3</sup>*Dokuz Eylül University, Physics Department, 35160 Buca, İzmir, Turkey*

<sup>4</sup>*Faculty of Technology, Department of Optical Engineering,*

*Cumhuriyet University, 58140 Sivas, Turkey and*

<sup>5</sup>*Grupo de Materia Condensada-UdeA, Instituto de Física,*

*Facultad de Ciencias Exactas y Naturales,*

*Universidad de Antioquia UdeA, Calle 70 No. 52-21, Medellín, Colombia\**

## Abstract

The effects of electric and magnetic fields on the second and third harmonic generation coefficients in a Morse potential quantum well are theoretically studied. The energy levels and corresponding wave functions are obtained by solving the Schrödinger equation for the electron in the parabolic band scheme and effective mass approximations and the envelope function approach. The results show that both the electric and the magnetic fields have significant influence on the magnitudes and resonant peak energy positions of the second and third harmonic generation responses. In general, the Morse potential profile becomes wider and shallower as  $\gamma$ -parameter increases and so the energies of the bound states will be functions of this parameter. Therefore, we can conclude that the effects of the electric and magnetic fields can be used to tune and control the optical properties of interest in the range of the infrared electromagnetic spectrum.

PACS numbers: 78.67.Hc; 78.67.-n

---

\*E-mail me at: [ricardo.restrepo@eia.edu.co](mailto:ricardo.restrepo@eia.edu.co)

Download English Version:

<https://daneshyari.com/en/article/5488597>

Download Persian Version:

<https://daneshyari.com/article/5488597>

[Daneshyari.com](https://daneshyari.com)