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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 γ-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.

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