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Optical absorption coefficient of non-concentric spherical core-shell quantum dot

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Abstract

This work calculates the optical absorption coefficient of a spherically non-concentric core-shell quantum dot, induced by interband transitions. The effective mass method and a model of rectangular potential wells and barriers are applied. The solution of the Schrödinger equation is obtained using the plane wave method. Dependencies of the absorption coefficient on the non-concentricity parameter are determined. The influence of the distribution of quantum dots by the degree of non-concentricity on optical absorption is considered. Theoretical results show the optical absorption dependence on the non-concentricity parameter. The obtained results are consistent with experimental data. © 2024 Elsevier B.V.

Author keywords

Core-shell quantum dot; Non-concentricity; Optical absorption

Indexed keywords

Engineering controlled terms

Nanocrystals; Semiconductor quantum dots; Shells (structures)

Engineering uncontrolled terms

Core/shell quantum dots; Effective mass; Inter-band transition; Mass method; Non-concentricity; Optical absorption coefficients; Plane-wave method; Potential barriers; Potential wells

Engineering main heading

Light absorption

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Abstract

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