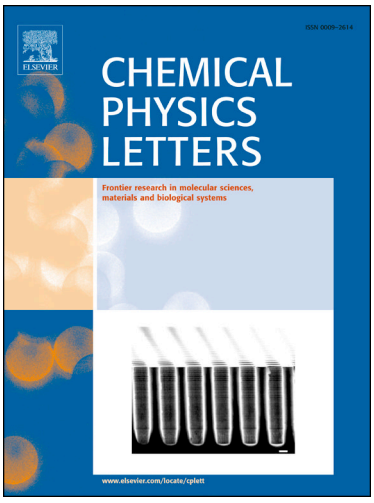

Research paper

Investigation of Magnetic Field Effects on Binding Energies in Spherical Quantum Dot with Finite Confinement Potential

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Investigation of Magnetic Field Effects on Binding Energies in Spherical Quantum Dot with Finite Confinement Potential

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Abstract: The magnetic effects on the energy states and binding energies of the ground and higher excited states of the spherical quantum dot are studied theoretically for various potential depths. Also, Zeeman transition energies in the case of $\Delta M=0,\pm 1$ are carried out. The results show that the energy states and binding energies in small dot radii are insensitive to the increase of magnetic field. In the case of negative *m*, in the strong confinement region, the binding energy increases as the confinement potential decreases. In the case of positive *m*, the binding energy decreases with the decrease of the confinement potential.

Key words: Spherical quantum dot, magnetic field effect, binding energy, QGA and HFR method, Zeeman splitting

1. Introduction

During the past few years, among low dimensional semiconductors, quantum dots in which charge carriers are confined in all three directions have attracted much interest due to their potential device applications in semiconductor technology. Spatial confinement of the motion of electron in spherical quantum dots (SQDs) leads to the formation of discrete energy levels, like real atoms. This limitation causes the drastic change and dramatically affects electronic structures and optical properties of QDs. The other effect causing a change in electronic and optical properties is the presence of impurity. Impurity dramatically alters performance and

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