

## عنوان مقاله:

Study of the Spin-Orbit Interaction Effects on Energy Levels and the Absorption Coefficients of Spherical Quantum Dot and Quantum Anti-Dot under the Magnetic Field

## محل انتشار:

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## خلاصه مقاله:

In this study, the energy levels of spherical quantum dot (QD) and spherical quantum anti-dot (QAD) with hydrogenic impurity in the center, in the presence of spin-orbit interaction (SOI) and weak external magnetic field have been studied. To this aim, solving the Schrodinger equation for the discussed systems by using the finite difference method, the wave functions and energies of these systems are calculated. Then the effect of the external magnetic field, system radius size and height of potential barrier on the energy levels and also the linear, nonlinear and total absorption coefficients, (ACs), of the mentioned systems are studied. Numerical results show that the SOI in both models causes a split of  $\gamma_p$  level into two sub-levels of  $\gamma_{p-(1/2)}$  and  $\gamma_{p-(3/2)}$  where the low index indicates the total angular momentum J. Also, considering the electron spin, under an applied magnetic field, the  $1s$  and  $\gamma_p$  levels split into two sub-levels and six sub-levels, respectively. Furthermore, in this research, it is proved that energy changes are significantly different as a function of radius size and height of the potential barrier in QD and QAD models and the ACs of these systems behave differently according to the incident photon energy at the same condition.

## کلمات کلیدی:

Quantum Dot, Quantum anti-dot, Confinement potential, Spin-orbit interaction, Magnetic Field, Absorption Coefficient

## لینک ثابت مقاله در پایگاه سیویلیکا:

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