

عنوان مقاله:

Effects of on-center impurity on energy levels of low-lying states in concentric double quantum rings

محل انتشار:

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خلاصه مقاله:

In this paper, the electronic eigenstates and energy spectra of single and two-interacting electrons confined in a concentric double quantum rings with a perpendicular magnetic field in the presence of on-center donor and acceptor impurities are calculated using the exact diagonalization method. For a single electron case, the binding energy of on-center donor and acceptor impurities are also calculated. The effects of centrifugal, confinement and diamagnetic potentials on the binding energy are investigated. It is found that the binding energy decreases by increasing the centrifugal or confinement potential. Also, it is shown that the binding energy increases by increasing the magnetic field. The effects of on-center impurity on the energy spectrum and angular momentum transition of the lowest states are investigated for the both single and two-interacting electrons. It is found that the on-center donor impurity increases the fractional Aharonov-Bohm oscillation period while the acceptor impurity acts inversely and decreases the fractional Aharonov-Bohm oscillation period.

کلمات کلیدی:

Semiconductor nanostructures, Quantum confinement, Impurity, Aharonov-Bohm effect, Quantum rings

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