TWO-ELECTRON QUANTUM DOTS WITH PARABOLIC CONFINEMENT (LOW LYING PARA- AND ORTHO-STATES)

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S u m m a r y

Three low lying energy levels of a 3D two-electron quantum dot (QD) with parabolic confinement are obtained by the variational method. The proposed interpolation formulas for the variation parameters allow one to recover the energy levels in a wide range of the Coulomb interaction constant. The quantum states of the QD are divided into the para- and ortho-states like in the theory of helium atom. The quantum transitions from the ortho-state to the para- state are possible only with account of the spin-orbit interaction. At low temperatures, an ensemble of two-electron QDs contains dots in the ground para-state and in the first excited ortho-state, which is metastable. These QDs have the entangled spin wave functions that are related to the Einstein–Podolsky–Rosen (EPR) states desirable for the quantum information protocol.