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Singlet-Triplet Transitions of a Pöschl-Teller Quantum Dot

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Abstract: We study the energy spectra of a two-dimensional two-electron quantum dot (QD) with Pöschl-Teller confining potential under the influence of perpendicular homogeneous magnetic field. Calculations are made by using the method of numerical diagonalization of Hamiltonian matrix within the effective-mass approximation. A ground-state behavior (spin singlet-triplet transitions) as a function of the strength of a magnetic field is found. We find that the dot radius R of a Pöschl-Teller potential is important for the ground-state transition and the feature of ground-state for a Pöschl-Teller QD and a parabolic QD is similar when R is larger. The larger the well depth, the higher the magnetic field for the singlet-triplet transition of the ground-state of two interacting electrons in a Pöschl-Teller QD.

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