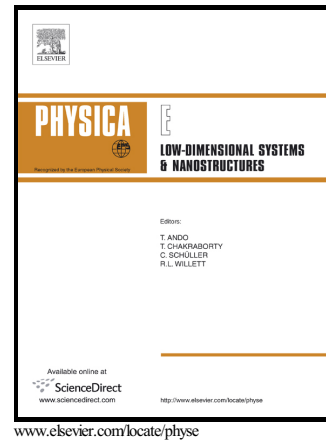


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**Energy levels of a particle confined in an ellipsoidal potential well**

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### Abstract

The Schrödinger equation is solved for a particle confined within the ellipsoidal potential well using the perturbation theory and the Hamiltonian diagonalization method. The explicit expressions are obtained for the energy levels that are the size and shape dependent and appropriate wave functions. The calculated energy levels are in a good qualitative and quantitative agreement with the result obtained by numerical solution of the Schrödinger equation. It is revealed that for the lowest states of a given symmetry the region of validity of the perturbation approximation is much larger than it follows from the usual condition of applicability of the perturbation theory. The optical properties of nanoparticles of a prolate and oblate ellipsoidal shape are discussed.

Keywords: ellipsoidal potential, nanoparticles, energy levels, perturbation theory, diagonalization method

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