APPLICATIONS OF DOUBLE WELL POTENTIALS IN THE COLLECTIVE NUCLEAR MOTION[*]

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Abstract

The recent applications of double well potentials in the description of shape coexistence phenomena and chiral symmetry breaking in nuclear physics is discussed with an emphasis on the analytical properties of the corresponding wave functions. By means of the density of probability distribution, the effect of the quantum tunneling on the composition of the wave functions is dully investigated. The results are used to identify the distinctive features between the one-dimensional and central multidimensional problems.

MSC: 34Axx, 34Bxx, 81Qxx, 81Vxx

keywords: Schrödinger equation, Double well potentials, Quantum tunneling, Nuclear collective motion, Triaxial rigid rotor, Bohr Hamiltonian.

1   Introduction

The numerical solution of the Schrödinger equation for a double-well potential is thoroughly studied in the one-dimensional case. This is due to its importance for the understanding of the unconventional nature of the