

particles. Recently the first-order relativistic DKP equation has been used to study the interactions of spinless mesons with nuclei. In this study, energy eigenvalues and eigenfunctions are obtained for DKP equation with the deformed Woods-Saxon potential, defined by three parameters: the depth, the radius and the surface diffuseness, for spin zero representation by using Nikiforov-Uvarov method which depends on the solution of second order linear differential equations whose solutions leads to hypergeometric type equations. Then, we get the bound states of the energy spectrum and behaviour of the bound states is determined numerically for a few discrete levels at different values of surface diffuseness parameter of the potential.



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ROTATIONAL-SINGLE PARTICLE AND VIBRATIONAL EXCITED STATES OF DEFORMABLE NON-AXIAL ODD NUCLEI

Sharipov Sh., Ermamatov M.J.

Institute of Nuclear Physics, Tashkent, Uzbekistan

Our recent works concerned to the study of excited states of deformed non-axial nuclei and to the nuclei with small non-axiality. These investigations explained a number of regularities in the spectra of deformed odd nuclei. It has been supposed that the state of outer nucleon is not changed by excitation, i.e. angular momentum of outer nucleon is conserved. Spin and parity of ground states of nuclei are determined by the spin of outer nucleon in this case. However states outer nucleon can change by excitation of the core and spins and parity of ground states should directly follow from the calculations in this case and depend on the parameters of the model.

Here non-adiabatic model of the deformable odd non-axial nuclei is proposed. Outer nucleon moves in the rotating and oscillating (longitudinally and transversely) non-spherical field of the core. There is interaction between outer nucleon and a core and it is changed by excitation of the core. Quantum characteristics of the excited states of deformable odd nuclei are calculated up to high spins. Comparisons of calculated values of excited states energies with experimental ones for the nuclei ^{153}Eu , ^{155}Gd , ^{157}Gd , ^{181}Re and ^{183}Re show that the model satisfactorily describes spectrum of deformable odd nuclei including states up to high spins.