# ON THE $\gamma$ - SOFT LIMIT IN THE $SO_8$ SYMMETRY OF FERMION DYNAMICAL SYMMETRY MODEL

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Bosonic and fermionic descriptions for the nuclear many body system are complementary. Without distinguishing between proton and neutron bosons, it gave rise to a successful phenomenology for medium and heavy nuclei, and is built from the concept of dynamical symmetry whose genesis is a group chain. The fermionic algebra, on the other hand, such as the fermion dynamical symmetry model (FDSM) [1], is necessarily more complex because it originates from the shell structure and uses protons and neutrons as building blocks. In this picture, it lacks the phenomenological freedom to separate the normal states from the exotic states and they should all be eigenstates of a Hamiltonian whose dominate feature must emphasize the intricate interplay between the long–range n–p quadrupole force and the short–range n–n and p–p pairing forces. Therefore the Hamiltonian is not symmetric under proton–neutron exchange. In the fermion description, the n–p quadrupole interaction responsible for splitting these types of state and give rise to two classes of states. One class is invariant under the exchange of the protons and neutrons. These states are referred as "normal". Another class is not invariant under the exchange and they are referred to as "exotic" or "mixed–symmetry" states.

As an example, we examine the spectrum and electromagnetic properties of $^{134}$Ba and $^{196}$Os.

**Reference:**

1. X-W. Pan, D. H. Feng, //Phys. Rev. 1994 C50, p.818.



# COLLECTIVE-SINGLE-PARTICLE EXCITED STATES OF DEFORMED ODD $^{155}$Eu AND $^{161}$Tm NUCLEI WITH SMALL TRIAXIALITY

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Recently we have developed non-adiabatic approach of deformed odd nuclei with small triaxiality [1]. In this work exponential type of potential for the longitudinal vibrations of the nuclear surface has been used and angular momentum of external nucleon has been considered as good quantum number. This approach has explained a number of regularities observed in the spectra of some deformed nuclei with small triaxiality. Here we apply the same approach for the investigation of the excited states of two deformed $^{155}$Eu and $^{161}$Tm nuclei.

Values of the parameters are determined from the fittng of the calculated spectra of above nuclei with their experimental counterparts. Then the same values are used for the calculation of reduced E2-transition probablities and quadrupole moments of the excited states of the deformed odd $^{155}$Eu and $^{161}$Tm nuclei.