

Systematics in the Structure of Low-lying, Non-yrast Configurations of Strongly Deformed Nuclei

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Strongly deformed nuclei show interesting patterns in the energy spectrum above around 1 MeV. An empirical investigation of the trends in the properties of the energy levels of low angular momentum, in nuclei that are related to one another through the addition or removal of alpha-particle-like structures, reveals their complex and changing behavior in contrast to the smooth behavior of the yrast states. A systematic application of the pseudo-SU(3) model for such a sequence of deformed nuclei, from the rare earth region, leads to an accurate and unified description of not only yrast, but non-yrast collective bands. The onset of deformation as manifested through the position of the excited band-heads in the spectra is interpreted by using a realistic model Hamiltonian in conjunction with a microscopic distribution of the eigenstates across allowed proton and neutron strong-coupled SU(3) configurations.