

Correlations in Structure among Observables and Enhanced Proton-Neutron Interactions

R.B. Cakirli

Department of Physics, University of Istanbul, Istanbul, Turkey

Abstract

Typical nuclear structure observables for even-even nuclei such as the first excited 2^+ state energy, and the ratio between the 4^+ and 2^+ states ($R_{4/2}$), give us the information about the evolution of structure. In one part of this talk, such observables and their differentials, including spectroscopic data and masses and correlations among them will be discussed. In addition, since the separation energy is a good filter for structure using masses, another filter, δV_{pn} , for heavy nuclei will also be presented and discussed in terms of spatial-spin orbit overlaps between proton and neutron wave functions. We will discuss that proton-neutron pairs of orbitals that fill almost synchronously in deformed medium mass and heavy nuclei, satisfy 0[110] differences in Nilsson quantum numbers and correlate with changing collectivity. These data and results will be discussed in terms of the growth of collectivity in nuclei as a function of the numbers of valence nucleons.