

Abstract Submitted  
for the APR08 Meeting of  
The American Physical Society

**Nuclear shell structure in anharmonic oscillator potential** F. BARY MALIK, Southern Illinois University Carbondale, ANUP MAJUMDER, Allergan Inc. & University of Phoenix Online — The studies of binding energies of light and medium-light nuclei have established anomalous trend of shell structure compared to the one expected in the case of isotropic harmonic oscillator for nuclei away from the valley of stability and close to the drip lines. We have, therefore, studied the nature of the shell-gap expected in anharmonic three dimensional oscillator potential with a spin-orbit and  $l \cdot l$  term. The energy gaps among minor shells are strongly dependent on the degree of anisotropy and the strength of the spin-orbit coupling. Many of the anomalous gaps e.g. large gap for  $N = 14$  and dwindling gap for  $N = 8$  could be ascribed to anisotropic harmonic mean field. Thus, many of the exotic nuclei seem to have large deformation and need to be treated with anisotropic harmonic basis set or described by rotational model with rotational-particle coupling. Typical level scheme as a function of anharmonicity will be presented.

F. Bary Malik  
Southern Illinois University Carbondale

Date submitted: 11 Jan 2008

Electronic form version 1.4