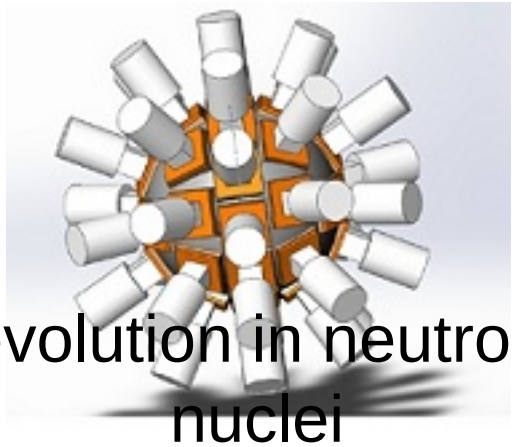
Frontiers in Gamma Ray Spectroscopy FIG18



Contribution ID : 69

Shape evolution in neutron-rich Zr nuclei

Monday 12 Mar 2018 at 15:30 (00h30')

Content :

The study of various modes of excitations and the associated evolution of nuclear shapes along spin and isospin axes in atomic nuclei is one of the fundamental quest in nuclear physics. In this regard, the neutron rich nuclei with Z~40 and N~60 have attracted considerable attention recently. While the ground states of Sr, Zr, and Mo isotopes with N ranging from the magic number N = 50 up to N<60 are weakly deformed, they undergo a shape transition from nearly spherical to well deformed prolate deformations as N = 60 is approached. This shape transition is rapid in Sr and Zr isotopes as evident from the abrupt changing of lifetimes and excitation energies of 2^+_1 states. Whereas, in isotopes with Z≥42 the shape change is rather gradual showing characteristic signatures of triaxiality. This strong dependence of observed spectroscopic properties on the number of protons and neutrons, makes the neutron-rich A~100 nuclei a very good region for testing various theoretical models. Several experimental and theoretical efforts have been made to investigate the structural evolution in these nuclei, however, a satisfactory description is still far from being complete. Further experimental information, especially lifetime and static quadrupole moments of these nuclei is an important step towards providing a firmer understanding of their properties through comparisons with modern theoretical models. Some recent results from our experimental program to study these nuclei using fusion-fission experiment performed at GANIL will be presented and the future prospects will be discussed.

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Session classification : --not yet classified--

Track classification : --not yet classified--

Type : Invited Talk