Frontiers in Gamma Ray Spectroscopy FIG18

Contribution ID : 75

Exploring nature of collectivity in Lu nuclei with mass A ~165 via lifetime measurements

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Content :

The Lu nuclei (A = 161 -167) present normal deformed prolate shape near ground state but assume strongly deformed triaxial shapes (TSD) [1] at I >= 25 h. The origin of large triaxiality (γ ~ 150) giving TSD bands at high spins in Lu nuclei, though difficult to describe, is rather important in order to understand. Interestingly, beyond 167Lu [2], no other higher mass Lu nuclei has shown any TSD band at high excitation. This further complicates the issue of the origin of triaxiality. Experimentally, information about triaxiality can be obtained either by observing decoupled bands and evaluating their signature splitting, as has been done for the yrast 9/2- band in 163-165Lu [3] or by measuring the quadrupole moment of the band as done in 165Lu [3]. However, the signature splitting as observed in 163 -165Lu can also be due to K- mixing [3, 4] in axially deformed nuclei. The quadrupole moment on the other hand, depends upon deformation parameter (β2) and triaxiality parameter (γ) and therefore provides a more reliable test of axial asymmetry of the nucleus. Due to this reason, the quadrupole moment of the yrast band in 167Lu was determined using RDM lifetime measurement technique.
The experiment was done at the Inter University Accelerator Center (IUAC), New Delhi, using 159Tb(12C, 4n)167Lu reaction at a beam energy of Elab = 74 MeV. The results of the measurement are very encouraging. Comparison of experimental Qt values with the values of Qt extracted using (β2, γ) values obtained through total routhian surfaces (TRS) calculations, agree at low spins but tend to differ at higher spins suggesting a small involvement of triaxiality in 167Lu. The detailed analysis of the results and conclusions drawn will be discussed during the presentation.

Refrences

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