

Frontiers in Gamma Ray Spectroscopy

FIG18

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Spectroscopy of ^{131}Xe from α induced Reaction

Content :

Nuclei around $Z > 50$ and $N < 82$ are interesting testing ground to explore the suitability and predictive powers of nuclear models at both low and high spins. Particular interest in the $A \sim 130$ transitional mass region is that, at low spins, the nuclei show small axial deformation whereas at higher spins, shape coexistence may occur due to the competition between the proton alignment to the prolate side, and the neutron alignment near the top of the $h_{11/2}$ subshell, driving it to an oblate one[1]. The available data on low-spin states in ^{131}Xe are from beta-decay studies [2], (α, n) [3] and $(\alpha, 3n)$ [4] reactions, which highlights only the low spin structures. Spectroscopic measurements using Alpha induced reactions with high efficiency gamma detector array can be used as a powerful tool to understand the single particle structures as well as the collective properties of a nucleus upto a reasonable spin. In the present work, excited levels of ^{131}Xe were populated by using the reaction $^{130}\text{Te}(\alpha, 3n)^{131}\text{Xe}$ at beam energy 38 MeV delivered from K-130 cyclotron at VECC (Kolkata). Indian National Gamma Array (INGA) at VECC consisting of seven Compton suppressed Clover detectors were used for gamma detection. Four of the used Clover detectors were at 90 degree, two of them were at 125 degree and one at 40 degree with respect to the beam direction. Digital data acquisition system consisting of PIXIE-16 digitizer module was used to acquire the time stamped LIST mode data. Preliminary analysis predicts the extension of the yrast negative parity band with new transitions. The presence of few more new band structures are also been observed in the analysis. Details of this analysis along with new results will be presented.

[1] A. Granderath et al., Nucl. Phys. A 597, 427 (1996)

[2] B.K.S. Koenet et al., Nucl. Physics A219, 563-572 (1974)

[3] T. Lonnroth et al., Physica Scripta. Vol. 27, 228-240 (1983)

[4] A. Kerek et al., Nuclear Physics A172, 603-617 (1971)

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