Frontiers in Gamma Ray Spectroscopy FIG18

Contribution ID : 44

Test of Chirality in 130La using lifetime measurement

Content :

Many nuclei near mass 130- with two nearly degenerate bands- were earlier established to have Chiral symmetry. But the electromagnetic selection rules for the inter-band and intra-band transitions provide the stringent criteria for the bands to be qualified as Chiral [1, 2]. The reduced transition probabilities, the B(E2) values follow the identical pattern for the two Chiral bands, whereas the B(M1) values alternate between the low and high values for intra-band as well as inter-band transitions. While 128Cs showed the expected behavior, 132La deviated from the selection rules [3]. To ensure Chirality for the existing two nearly degenerate bands in 130La [4, 5] on the basis of the suggested selection rule, we performed an experiment at the Inter University Accelerator Center (IUAC), New Delhi. The Indian National Gamma Array (INGA) (with 18 Compton suppressed clover HPGe detectors) was utilized. A self-supporting 116Cd target (thickness ~ 4.6 mg/cm2) was bombarded with the 19F beam at energy 94 MeV. The nucleus 130La was formed via reaction 116Cd(19F, 5n)130La with the maximum cross-section. Three asymmetric matrices corresponding to detectors in the forward, backward and 90° angles were constructed. The gamma transitions belonging to the proposed Chiral bands [4] were clearly identified in the projected spectrum with gates on two low lying 137 keV and 279 keV transitions. The initial lineshape fitting has been done for many states and tentative values of the lifetimes were found in the picosecond range using Doppler shift attenuation method (DSAM). A rigorous data analysis is in progress and the results will be presented.

[1] I. Hamamoto, Int. J. Mod. Phys. E 20, 373 (2011).
[2] A. A. Pasternak, Phys. Atom. Nucl. 73, 8 (2010).
[3] E. Grodner et al., Phys. Rev. Lett. 97, 172501 (2006).
[4] T. Koike et al., Phys. Rev. C 63, 061304(R) (2001).
[5] K. Y. Ma et al., Phys. Rev. C 86, 027301 (2012).

Primary authors : Mr. SINGH, Himanshu Kumar (Department of Physics, Indian Institute of Technology Bombay, Powai, Mumbai - 400076, INDIA)

Co-authors : Prof. DAS, Pragya (Department of Physics, Indian Institute of Technology Bombay, Powai, Mumbai - 400076, INDIA) ; Dr. MURALITHAR, S. (Inter University Accelerator Centre, Aruna Asaf Ali Marg, New Delhi - 110067, INDIA) ; Dr. SINGH, R. P. (Inter University Accelerator Centre, Aruna Asaf Ali Marg, New Delhi - 110067, INDIA)

Presenter : Mr. SINGH, Himanshu Kumar (Department of Physics, Indian Institute of Technology Bombay, Powai, Mumbai - 400076, INDIA)

Session classification : --not yet classified--

Track classification : --not yet classified--

Type : Poster