

## High-K Structures in the $^{164}\text{Er}$ Region

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Several multi-quasiparticle isomers have been observed for the first time in a gamma-spectroscopy experiment performed at the Australian National University Heavy Ion Accelerator Facility.

A fusion-evaporation reaction using a 57 MeV, pulsed,  $^9\text{Be}$  beam incident on a  $^{160}\text{Gd}$  enriched target was used to populate nuclei in the vicinity of  $^{164}\text{Er}$ . Of specific interest was a known four quasi-particle isomer in  $^{164}\text{Er}$  with an uncertain half-life [1]. The bunched and chopped beam provided ideal conditions for the half-life measurement of all gamma-decaying levels observed using the CAESAR array [2], which consists of nine HPGe detectors and two LEPS detectors.

Twelve different isotopes with observable gamma ray transitions were detected in the experiment, many produced by the incomplete fusion channel. Of these, three were observed to possess new multi-quasiparticle isomers:  $^{162}\text{Dy}$ ,  $^{163}\text{Ho}$  and  $^{165}\text{Er}$ . A precise measurement of the  $^{164}\text{Er}$ ,  $K=12^+$  isomer's half-life was made that greatly improved upon earlier estimates [1]. Half-life measurements up to several micro-seconds will be presented along with structural assignments for all of the new isomers.

An analysis which yields an estimate for the K value of the s-bands in  $^{164}\text{Er}$  and  $^{162}\text{Dy}$  will be presented. The same method has been applied to other nuclei in the region by Walker [3], elucidating the relationship between neutron number and s-band K value. The surprisingly high K values obtained provide an explanation for the existence of highly forbidden transitions from K-isomers to the ground-state bands of nuclei in the region.

\* This work is supported by the STFC (UK) and the EPSRC (UK).

[1] R. Bark *et al.*, *Z. Phys A*359, 5 (1997)

[2] G. D. Dracoulis and A. P. Byrne, Department of Nuclear Physics Annual Report No. ANU-P/1052 (1989) (unpublished)

[3] P. M. Walker, *J Phys G*34, 123 (2007)