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Proton alignments at high rotational frequency in ^{167,168}Yb

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Abstract

High-spin states in ^{167}Yb and ^{168}Yb have been investigated using the ^{124}Sn(^{48}Ca,xn) reaction at a bombarding energy of 210 MeV. The level sequences of the two nuclei were established from a large set of high-fold γ-ray coincidence data detected in the EUROGAM spectrometer. The experimentally observed upbends at high rotational frequency are discussed in terms of the cranked shell model for protons both with and without pairing. An unpaired crossing involving interchange of proton orbitals is tentatively identified. No evidence was found for hyperdeformation.

Keywords: NUCLEAR REACTIONS ^{124}Sn(^{48}Ca, 5–4n) ^{167,168}Yb, $E = 210$ MeV; measured E_γ, I_γ, $\gamma\gamma\gamma$-coinc. ^{167,168}Yb deduced levels, rotational bands, aligned angular momentum, *i*. Cranking model, Nilsson, Woods–Saxon

1. Introduction

It has been recognised for many years that rare-earth nuclei with atomic number $Z \sim 70$ and neutron number $N \sim 98$ exhibit rather stable prolate-deformed shapes, which are largely independent of spin and configuration [1]. Total routhian surface

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