High-spin states and deformation properties in ^{187}Pt

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Abstract. High-spin states in ^{187}Pt have been studied by means of γ-ray spectroscopy techniques. Known bands have been significantly extended and new bands have been found. The band structures are briefly discussed.

Keywords: nuclear reaction, ^{181}Ta(^{11}B,5n)^{187}Pt, E=71 MeV, nuclear structure, ^{187}Pt deduced high spin levels, shape coexistence
PACS: 21.10.Re, 21.60-.Ev, 23.20.Lv, 27.70.+q

INTRODUCTION

The Pt-Au-Hg transitional region is known to exhibit shape coexistence [1, 2], triaxiality [1], and conversion anomaly of the M1 transitions [3] among other features. Even-even Pt nuclei change from triaxial-prolate to triaxial-oblate shape around A = 187. The low-lying states of odd Pt nuclei correspond to prolate shapes for A < 186, while the nuclear shape for A > 186 is still an open question [4]. In this context, the study of the ^{187}Pt nucleus can contribute to the understanding of the region.

RESULTS AND DISCUSSION

High-spin states in ^{187}Pt have been populated through the ^{181}Ta(^{11}B,5n) fusion-evaporation reaction at E(^{11}B) = 71 MeV. The beam was provided by the Tandem-LINAC superconducting accelerator at the Florida State University, USA. The target consisted of a 5.8 mg/cm^2 self-supporting ^{181}Ta foil. The γ-ray detection array included 3 clover and 3 single-crystal Compton-suppressed Ge detectors. A partial ^{187}Pt level scheme obtained in this experiment is shown in Figure 1.

Band C, already assigned as $\nu i_{13/2}$, is the most strongly populated band and displays a delay in the crossing frequency. Due to its large alignment (i= 5$\hbar$) and the pronounced level staggering, the band must involve a low-Ω orbital (5/2$^+$[642]), which corresponds to an oblate deformation. Band A predominantly decays to band C and has comparable alignment. Similar bands have been observed in ^{183,185}Os, being interpreted as an $i_{13/2}$ neutron coupled to a γ-vibration [5]. The band heads of bands G and H correspond to the ground state and the 25.6 keV state, respectively, observed through β^+/EC decay [6]. Band I, already observed up to I = 17/2 $\hbar$ and assigned as 7/2$^-$[503] [6], has been

CP884, *VI Latin American Symposium on Nuclear Physics and Applications*,
edited by O. Civitarese, C. Dorso, G. García Bermúdez, A. J. Kreiner, A. J. Pacheco, and N. N. Scoccola

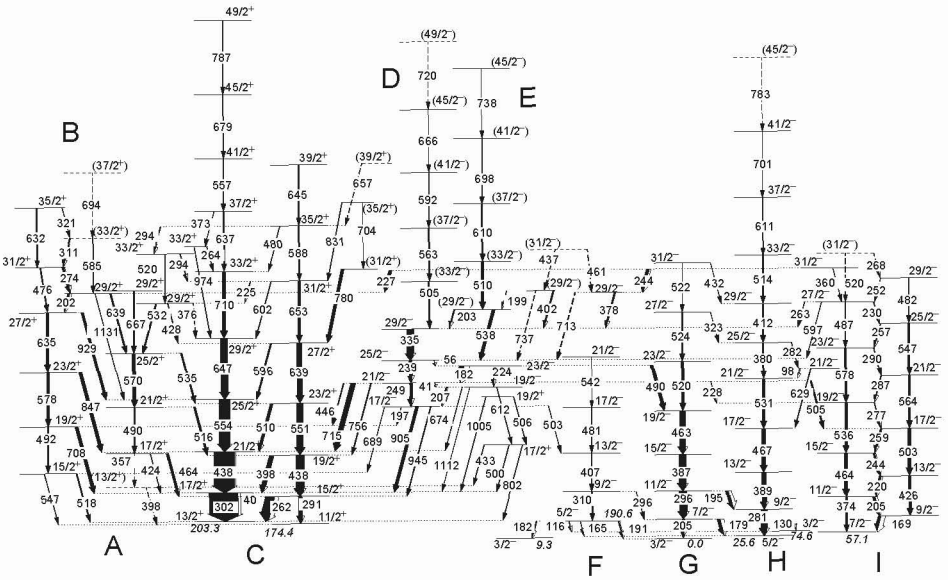

FIGURE 1. Partial level scheme for ^{187}Pt

extended and its band head fixed at 57.1 keV. Since this band corresponds to a prolate deformation, the shape coexistence occurs from low excitation energy.

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