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K=4+ Band-heads in 160Gd

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Detailed spectroscopy of neutron-rich, deformed rare-earth nuclei is of broad interest for nuclear structure. The structure of nuclei midshell in both proton and neutron number helps to understand the evolution of deformed subshell gaps and the interplay of single-particle and collective degrees of freedom in these nuclei. High-statistics decay spectroscopy of ^{160}Gd resulting from the β-decay of ^{160}Eu was performed using the GRIFFIN spectrometer at the TRIUMF-ISAC facility. An updated half-life for the β-decaying isomer in ^{160}Eu was measured, and a number of newly observed excited states, transitions, lifetimes, γ-γ angular correlations, and mixing ratios were measured for the first time in ^{160}Gd. In particular, the lifetimes and angular correlations relating to the two $K^{\pi} = 4^{+}$ band-heads in ^{160}Gd were measured and shed light on the possible structure of these bands. Additionally, lifetime and mixing ratio measurements were performed for the proposed (5^{-}) state at 1999 keV that is heavily populated by the ground-state β-decay of ^{160}Eu. The measurements raise questions about the assigned spin and parity as well as underlying quasi-particle configurations for both the 1999 keV state in ^{160}Gd and the ground-state of the parent ^{160}Eu.

In this talk, I will discuss the new measurements and implications on the $K^{\pi} = 4^{+}$ bands in regards to the interpretation of these bands as being strongly-mixed quasi-particle configurations versus hexadecapole vibrational bands, as well as an updated proposal for the configuration of the ground-state of the parent ^{160}Eu.

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