

BEHAVIOR OF INTRUDER BASED STATES IN LIGHT BI AND TI ISOTOPES: THE STUDY OF ^{187}Bi α DECAY¹

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Intruder state excitation energies in odd-mass nuclei just outside a closed proton shell plotted versus neutron number generally exhibit parabola-shaped curves with minima near neutron mid-shells. The Bi isotopes, however, do not seem to follow this trend. Recent experiments performed at Argonne National Laboratory have identified the previously unobserved ^{187}Bi ground state ($h_{9/2}$) to ^{183}Tl ground state $s_{1/2}$ α transition. Its energy when combined with those of two earlier known transitions, namely $^{187}\text{Bi} (h_{9/2}) \rightarrow ^{183m}\text{Tl} (h_{9/2})$ and $^{187m}\text{Bi} (s_{1/2}) \rightarrow ^{183}\text{Tl}(s_{1/2})$, establishes the excitation energies of the ^{183m}Tl and ^{187m}Bi to be 620(20) keV and 110(20) keV, respectively. This value for ^{187m}Bi is 80 keV lower than the excitation energy of the same intruder level in ^{189}Bi . Implications of this result with respect to intruder-state systematics are discussed.

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