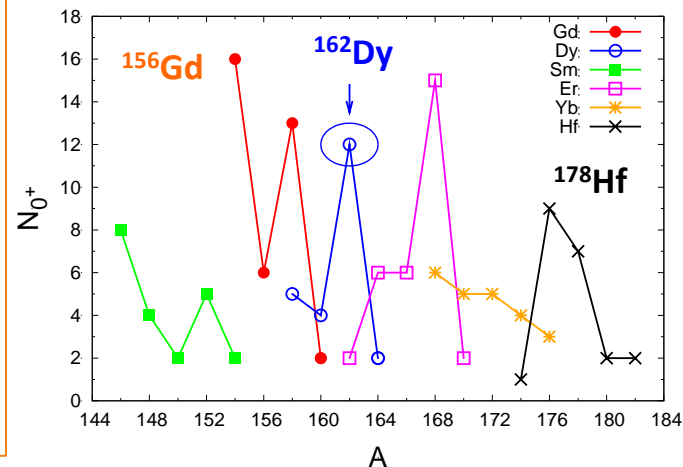


Nature of 0^+ states in Deformed Nuclei

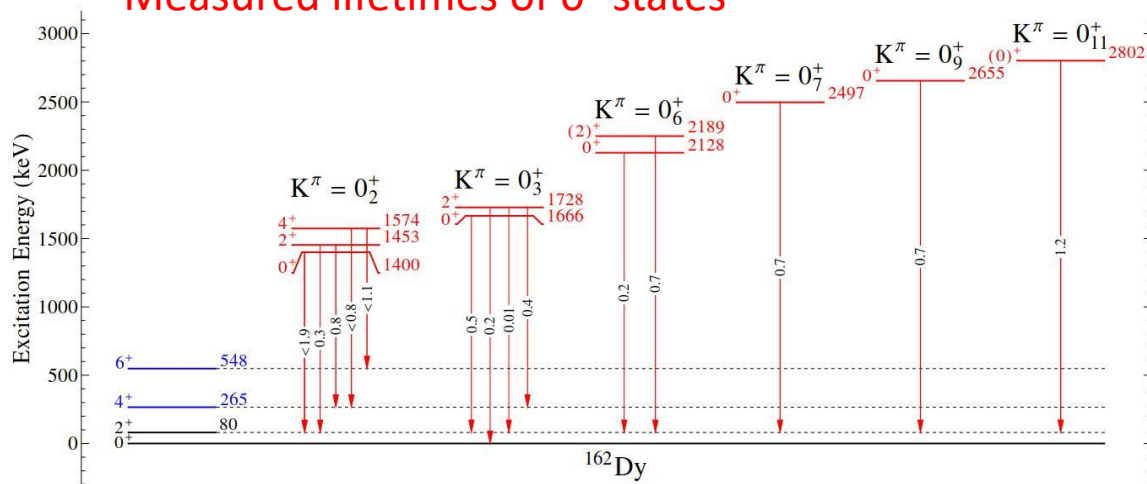


The nature of 0^+ states in deformed nuclei remains a grand challenge for nuclear structure physics. Recently, a large number of 0^+ states have been observed in deformed nuclei but their characterization remains elusive. We have measured the lifetimes of 58 levels in ^{162}Dy using Doppler Shift Attenuation following $(n, n'\gamma)$ at the Univ. of Kentucky.

Number of observed 0^+ states



Measured lifetimes of 0^+ states



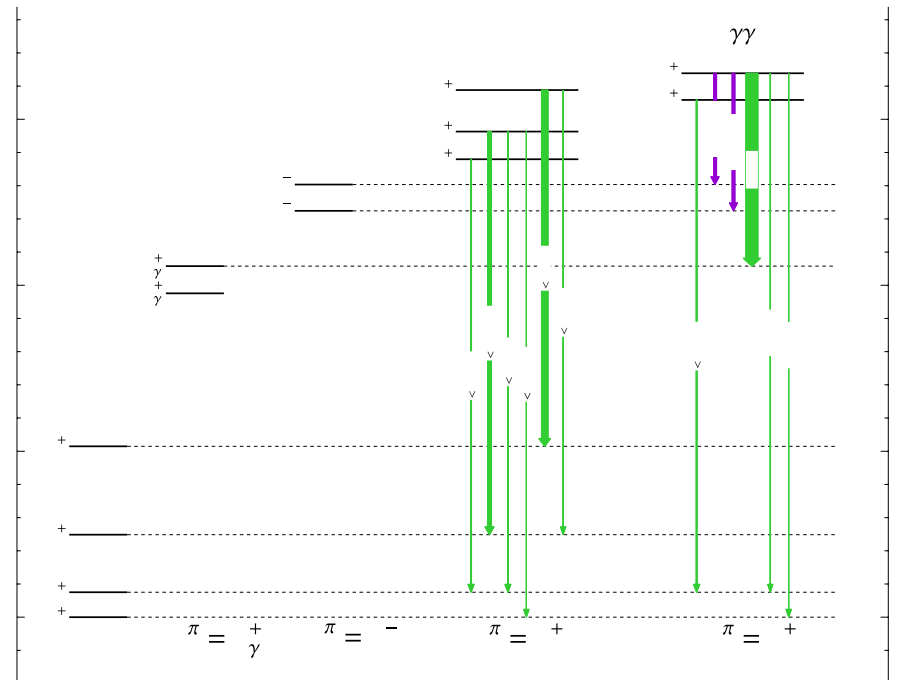
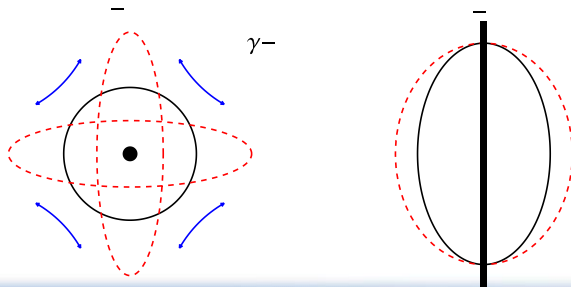
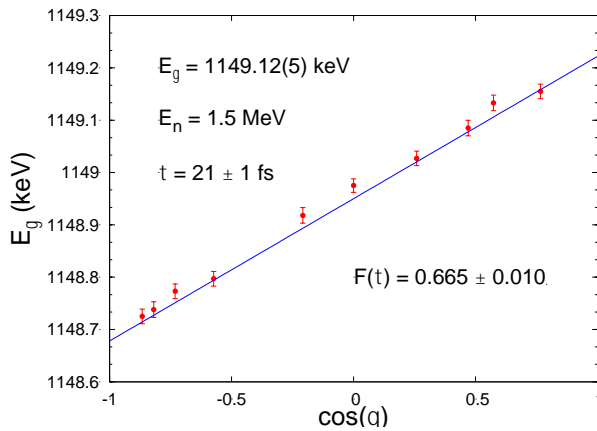
C. Casarella, S.R. Lesher, A. Aprahamian et al.



0^+ Lifetimes using $^{160}\text{Gd}(n,n'\gamma)$



The exact nature of 0^+ states, a fundamental excitation in deformed nuclei, has remained an enigma for several decades. Full elucidation of this nature hinges on the measurement of nuclear lifetimes. We measured several crucial lifetimes of 0^+ states in ^{160}Gd with the Doppler Shift Attenuation Method, and have identified a two-phonon $\gamma\gamma$ vibration in the third 0^+ band.



S. R. Leshar, C. Casarella, A. Aprahamian, et al, *Phys. Rev. C* 91, 054317 (2015)



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