

# Investigating the boundaries of enhanced octupole collectivity in the rare-earth region

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Atomic nuclei which exhibit a reflection-asymmetric shape are of considerable interest for the understanding of nuclear structure. These "pear-shaped" nuclei are expected to occur in the regions of the nuclear chart where the octupole degree of freedom is enhanced. Strong octupole correlations manifest when the Fermi surface lies close to single-particle orbitals with quantum numbers  $[l,j]$  and  $[l-3,j-3]$  giving rise to the octupole magic numbers  $N,Z=34,56,88$  and  $N=134$ . Atomic nuclei in these regions can exhibit enhanced particle-hole interactions from the octupole component of the nucleon-nucleon interaction. The electric-octupole (E3) transition rate provides the most unambiguous signature of octupole collectivity; however, such measurements are often extremely challenging, as E3 transitions compete very weakly against other allowed transitions.

The region around  $Z=56$ ,  $N=88$  possesses the most complete set of  $B(E3)$  values across the nuclear chart, with the largest values observed in  $^{148}\text{Gd}$  and  $^{150}\text{Gd}$ ; however, spectroscopic data for the dysprosium isotopes is largely missing. Within the  $N=82$  chain, increasing  $B(E3)$  strength is observed with increasing proton number from  $Z=54$  (Xe) to  $Z=64$  (Gd) and it remains unknown whether this trend continues in  $^{148}\text{Dy}$  ( $Z=66$ ). To investigate whether enhanced octupole collectivity is present in dysprosium isotopes and extend or constrain the boundaries of enhanced octupole collectivity, we performed a direct measurement of the  $B(E3)$  value in  $^{148}\text{Dy}$ . A beta-decay study of  $^{148}\text{Ho}$  was performed at the TRIUMF facility using the GRIFFIN spectrometer. The mean lifetime of the  $3^-$  state was measured using fast-timing methods with LaBr detectors.