A New Proposal to the High Intensity Gamma-Ray Source (HI\(\gamma\)S) PAC-12

Decay behavior of low-lying M1 excitations in \(^{162,164}\text{Dy}\)

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October 19, 2012
1 Experiment Summary

We propose to measure the decays of $1^+$ states around 3 MeV in excitation energy in $^{162,164}$Dy. This is the energy regime where the scissors mode has been found in this mass region. The aim of the experiment is to identify the coupling of the scissors mode to $\gamma$-vibrations through direct observation of decays to the $2^+$ state. In a geometrical picture, such decay would be forbidden, but inferring a finite valence space, it is predicted to exist in algebraic collective models. We have previously observed indirect hints of this transition from the 3173-keV state in $^{163}$Dy at HIGS, which left questions about that particular $1^+$ state unanswered. The aim of this proposal is to build on previous work with the present orders of magnitude improvements in beam and exploiting the new possibilities for coincidence measurements.