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# Decay Characteristics of the Scissors Mode of 0νββ-Decay Partner Isotopes*

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The search for neutrinoless double beta (0νββ) decay, a process only allowed if the neutrino were a Majorana particle, recently gained much attention with numerous experiments being dedicated to its observation. It would demonstrate lepto-genesis in the universe and allow the determination of the neutrino mass from its decay rate. However, to quantitatively extract the neutrino mass or estimate decay rates a nuclear matrix element (NME) is required, which has to be calculated using nuclear structure models. One of them is the Interacting Boson Model 2 (IBM-2), which will be discussed below. Those calculations can be difficult because many of the 0νββ-decay candidate nuclei lie in regions of the nuclear chart that feature shape coexistence, with the hypothesized 0νββ-decay mother nucleus $^{150}$Nd and its daughter $^{150}$Sm even being located in the region of a shape phase transition along their respective isotopic chains. In particular, the occurrence of shape coexistence may lead to a significant population of an excited $0^+$ state in 0νββ decay. To improve 0νββ-NME calculations for $^{150}$Nd and $^{150}$Sm within the IBM-2 information on its so-called Majorana interaction is needed. Therefore, new data on the decay characteristics of the scissors mode of these nuclei was recently taken in nuclear resonance fluorescence experiments performed at the High Intensity γ-ray Source. The decay characteristics of the scissors mode are sensitive to the nuclear deformation and allow inducing constraints on model parameters, especially the Majorana parameters of the IBM-2, in turn resulting in a more reliable prediction of the 0νββ-NME. Similar information has also been obtained for the 0νββ-partner nuclides $^{82}$Se and $^{82}$Kr. The experimental results and updated IBM-2 calculations will be presented and discussed.
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