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Isovector-E2 strength of the scissors mode of 152Sm

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The nucleus ^{152}Sm is well known to be located at the $N = 90$ quantum shape-phase transition (QSPT) boundary. Since the scissors mode (SM) is a collective, isovector excitation, its decay characteristics depend on the proton-neutron residual interactions and are sensitive to the QSPT. The SM is known for its large $M1$-excitation strength, however, data on isovector $E2$ properties are sparse [1]. The SM of ^{152}Sm was investigated in a nuclear resonance fluorescence experiment performed at the High-Intensity γ-Ray Source with a quasi-monoenergetic, polarized photon beam with an energy of 2.99(5) MeV. Emitted photons were detected by four high-purity germanium detectors positioned at angles sensitive to the multipolarities of the decay radiation of 1^π states. The isovector $E2$ transition of the SM of ^{152}Sm to the first 2^+ state has been deduced from the $E2/M1$ multipole mixing ratio of the $1^+_{sc} \rightarrow 2^+_1$ transition and its previously known transition rate. Experimental results are compared to predictions of the interacting boson model 2, yielding local values for proton and neutron effective quadrupole boson charges [2].
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[1] T.Beck *et al.*, Phys. Rev. Lett. **118** (2017) 212502
[2] K. E. Ide *et al.*, Phys. Rev. C **103** (2021) 054302

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