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γ-decay Behavior of the Giant Dipole Resonances of 154Sm and 140Ce

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The giant dipole resonance (GDR) is one of the most fundamental nuclear excitations and dominates the dipole response of all nuclei. Its evolution from a single-humped structure to a double-humped structure is considered as one of the most direct signatures of collectivity and nuclear deformation. Yet, its γ-decay behavior, despite being a key property, is still mostly unknown.
Recently, novel data on the γ-decay of the GDR of the well-deformed nuclide ^{154}Sm and the spherical nuclide ^{140}Ce were obtained through photonuclear experiments at the HIγS facility. Individual regions of the GDR were selectively excited by HIγS' intense, linearly-polarized and quasi-monochromatic γ-ray beam. This enabled an excitation-energy resolved determination of the GDR's γ-decay behavior. For ^{154}Sm in particular, the obtained data allow for a first experimental test of the commonly accepted K-quantum-number assignments to the double-humped GDR observed in deformed nuclei.
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