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Statistical γ decay and isomeric ratio of ^{168}Er from resonance neutron capture

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γ-ray spectra following the radiative capture on well-isolated s-wave neutron resonances of ^{167}Er were measured with the Detector for Advanced Neutron Capture Experiments (DANCE) located at Los Alamos National Laboratory. This highly-segmented calorimeter is an ideal tool for detecting complete γ cascades due to its efficiency and solid angle coverage.

Information on quantities governing the γ decay within statistical model – level density and photon strength functions – were obtained from analysis of the experimental spectra and their simulated counterparts employing the modelling code DICEBOX. Conclusions about dipole photon strength functions, in particular the scissors mode, describing transitions to the ground state were found to be consistent with those reported for the neighboring well-deformed rare-earth nuclei.

Furthermore, γ decay in ^{168}Er is heavily influenced by the presence of a short-lived isomeric state at the excitation energy 1094 keV with the lifetime $\approx$ 100 ns. We were able to detect the cascades feeding the isomer and the isomeric decay and we deduced the isomeric ratio for a few resonances. The obtained values are not compatible with the isomeric ratio determined from simulations within the statistical model, as the simulated values are underestimated for all the tested model combinations.

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