Do light nuclei display a universal γ-ray strength function?

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Particle-γ coincidences from the bombardment of 15 MeV and 32 MeV protons on a ^{46}Ti target are utilized to obtain γ-ray spectra as a function of excitation energy for ^{44,45,46}Ti [1-3]. The Oslo method has been used to extract simultaneously level density and γ-ray strength functions (γ-SFs). The rich ^{46}Ti data set of 110 million events allows analysis of the coincidence data for many independent data sets. As expected, the results are consistent with one common level density.

A method to study the evolution of the deduced γ-SFs as a function of excitation energy will be described. The γ-SFs are found to display strong variations for different initial and final excitation energies if transitions to the lowest states are involved. The differences in the γ-SFs can be explained as a consequence of Porter-Thomas fluctuations of individual intensities, and shows that this energy region cannot be used for determination of the universal γ-RSF. Even though, the deduced γ-SFs based on transitions within the quasi-continuum still indicate that the decay is governed by a universal γ-SF.

References:

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