

Puzzling γ -ray strength functions in Sc and V isotopes *

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Gamma emission is one of the most significant channels for nuclear de-excitation processes, and accompanies most nuclear reactions. Both γ decay and photo-absorption can be described through γ -ray strength functions, which are considered as a measure of the average electromagnetic properties of the nucleus, and reveal essential information on the nuclear structure.

The nuclear physics group at the Oslo Cyclotron Laboratory (OCL) has developed the so-called Oslo method, which enables the extraction of the nuclear level density and γ -ray strength function simultaneously from primary γ -ray spectra [1,2].

We report on experiments recently performed on $^{44,45}\text{Sc}$ and $^{50,51}\text{V}$ [3] at the OCL. The experimental level densities and γ -ray strength functions will be presented. The γ -ray strength functions of all four nuclei are shown in Fig. 1. For $E_\gamma \leq 3$ MeV, an anomalous increase in the strength functions appear. This behaviour has been seen in some Fe [4] and Mo [5] isotopes also. The underlying physics behind this very interesting feature has not yet been understood, as none of the standard models can account for it.

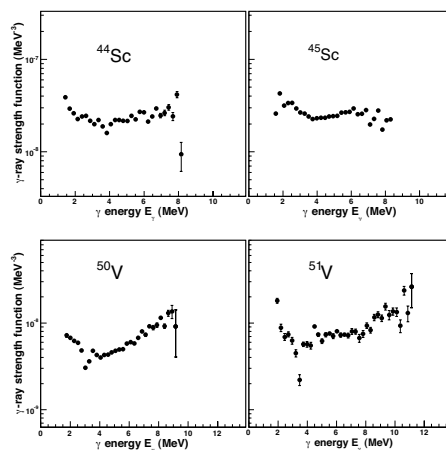


Figure 1: The γ -strength functions of $^{44,45}\text{Sc}$ and $^{50,51}\text{V}$ from Oslo experiments.

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