

Pygmy Dipole Resonance Explored by Using Beta Decay

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We present a study of the Pygmy Dipole Resonance (PDR) [1, 2] using γ -ray spectroscopy following β decay with high Q values from mother nuclei with low ground-state spins. This investigation is motivated by the inadequate and often inconsistent experimental data for the PDR obtained using the conventional (γ, γ') and (p, p') inelastic scattering.

In the present development we evaluate corresponding β decay transition probabilities by utilizing the concepts and instruments of the quasiparticle-phonon nuclear model (QPM) [3]. Such transitions to excited states in daughter nuclei have not been estimated theoretically until now and they hold the potential to reveal the extend of the applicability of a newly proposed experimental method for PDR exploration. The multiparticle-multihole composition of the initial states in odd-odd nuclei and especially of the final excited states in the even-even daughter nuclei is analysed in detail. We reckon that mother nuclei decay predominantly to the two-phonon components of the 1^- states in the vicinity of the neutron separation threshold.

References

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