

Problems and Possibilities of a Study of the Cascade Gamma-Decay of a Nucleus Excited below the Neutron Binding Energy

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The Dubna empirical model for simultaneous obtaining of the level density, ρ , and partial radiative widths, Γ , when the experimental dependence $I_{\gamma\gamma}(E_1)$ of the two-step gamma-decay intensities on the energy of primary quanta of the cascades is described, was used for reanalyze of the data obtained with γ -calorimeter of the DANCE spectrometer. The experimental spectra of the γ -cascade intensities for gamma-quanta multiplicity of $M \geq 2$ for \sim ten of even-even nuclei measured with the DANCE spectrometer were used by collaboration participants [1] to find among the existing models of the level density and radiative strength functions those which could exactly describe the experimental spectra. But the results of this employment were unsatisfactory.

The Dudna model always guarantees an obtaining of the nuclear parameters which conditioned by χ^2 minimum: $\chi^2 = (I_{\gamma\gamma}^{cal}(E_1) - I_{\gamma\gamma}^{exp}(E_1))^2 / \varepsilon^2$, where $I_{\gamma\gamma}^{cal}(E_1)$ and $I_{\gamma\gamma}^{exp}(E_1)$ are model-parametrized and experimental distributions of intensities, and ε^2 is a dispersion of their difference. Discovering of χ^2 redundancy corrects the initial parameters of iteration process. Our reanalyze of the data of [1] is compared with our analysis of two-step gamma-cascades for the same nucleus measured in Dubna [2].

1. S. Valenta et al., Phys. Rev. **C96**, 054315 (2017).
2. E.V. Vasilieva et al., Bull. Rus. Acad. Sci. Phys. **57**, 1758 (1993).