tration. Figures 2b - 2d illustrate the smearing of the DS picture with increasing Nd^{3+} concentration.

Another feature is that when the saturating pulse is shifted along the line contour, it is followed by the entire system of "holes" as a unit. This indicates a twofold nature of the EPR line broadening in FAP: as the result of the local inhomogeneity of the crystal field and as a result of the unresolved super-hyperfine structure due to the interaction of the Nd^{3+} with the nearest nuclei (F^{19} or P^{31}).

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ABSORPTION OF GAMMA QUANTA BY MANGANESE NUCLEI IN THE GIANT-RESONANCE REGION

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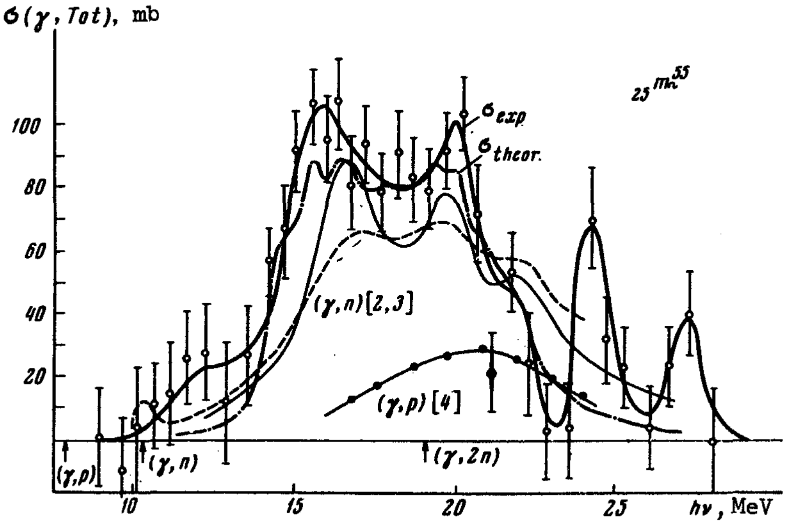
We measured, by the absorption method, the total nuclear cross section for the absorption of gamma quanta by the nuclei of manganese Mn^{55} in the energy interval 10 - 30 MeV. The measurements were performed with the bremsstrahlung gamma radiation spectrum ($E_{\gamma max}$ = 260 MeV) using the synchrotron of our institute. The photons were detected with a nine-channel magnetic paired γ spectrometer with resolution ≤ 1%. The absorber was made of an alloy of manganese with copper (97% Mn - 3% Cu).

The nuclear photoabsorption cross section was obtained by subtracting the normalized calculated atomic-absorption curve of [1] from the experimental atom-plus-nucleus cross section curve. The normalization was by shifting the theoretical cross section curve of [1] upward by 0.8% (18 mb at E = 9 MeV), making the average cross section σ(γ, Tot) below the threshold of the (γ, n) reaction (E_{thr} = 10.15 MeV) equal to zero.

The cross section of the nuclear photoabsorption σ(γ, Tot) for Mn^{55} is shown in the figure. The mean-square errors are indicated on the curve. The main part of the cross section (∿ 85%) lies in the interval 14 - 23 MeV. In the region of higher energies are located the well-resolved resonance at E_γ = 24.2 MeV (Γ ≈ 1 MeV, σ_0 = 90 mb-MeV) and E_γ = 27.4 MeV (Γ ≈ 1 MeV, σ_0 = 30 mb-MeV). The main broad giant-resonance peak is split into two maxima with an average energy 16.0 ± 0.3 MeV and 20.2 ± 0.3 MeV. For comparison, the figure shows also the cross sections of the reaction (γ, n) from [2, 3] and the reaction (γ, p) from [4].



Cross section for the photo-absorption by Mn^{55} nuclei in the giant-resonance region.

The dashed line in the figure is the result of calculation performed by us, within the framework of the dynamic collective model, using a deformation parameter $\beta = 0.30$ ($E_{dip} = 18.1$ MeV, $E_q = 0.845$ MeV). The theoretical curve describes well the form of the main peak, predicting correctly its width (∿ 9 MeV) and its splitting into two maxima. Our calculation based on the dynamic collective model is valid only for even-even nuclei and therefore, strictly speaking, the presented curve describes the excitations of the nucleus Mn^{54}. As seen from the figure, the course of the cross section for $E_\gamma > 25$ MeV (resonances at 24.2 and 27.4 MeV) does not agree with the predictions of the dynamic collective theory.

The integral cross section in the 9 - 29 MeV range is equal to 816 ± 50 mb-MeV, which amounts to 71% of the classical dipole sum with exchange term 60 (NZ/A) (1 + 0.8x). The integral cross section $\sigma_0(\gamma, \text{Tot})$ coincides within the limits of errors with the sum of the cross sections of the partial (γ, n) and (γ, p) reactions.

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YAG:Nd^{3+} LASER WITH EMISSION SPECTRUM WIDTH LESS THAN 10^{-9} Å

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Until recently, the minimum emission spectrum width obtained in solid-state lasers was ∿ 10^{-4} Å (∿ 10^6 Hz) [1]. The production of highly monochromatic coherent radiation in solid-state lasers is limited both by the number of the excited modes and by the spiked character of the radiation of each mode. Whereas the separation of one mode in the generation entails no special difficulties (see, for example, [2]), the problem of the spiked radiation of a solid-state laser, which is among the fundamental problems of the physics of solid-state lasers, has not yet been satisfactorily solved. When the radiation has a spiked character,