correspondence with ΔT_c^{sf}.

Our experimental results, which are shown in Fig. 2, are in good qualitative agreement with the theory (see Fig. 2 of [1]).

We believe the causes of the quantitative discrepancies between the experimental and theoretical T_c^{bs} and the noticeable quantitative disparity be-between the theoretical and experimental T_c^{sf} to be the following: (1) The experimental values of ΔT_c^{sf} contain, in addition to the contribution from the LSF, also a contribution due to thermodynamic fluctuations of the superconducting ordering parameter, which may not be small in this case. (2) In the Benneman-Garland theory, the entire effect of the suppression of T_c is ascribed to LSF on V atoms, and this effect is linear in concentration up to ~10 at.% V.

It is seen from Fig. 2 that a similar situation obtains also for Ti atoms at $x \leq 0.1$.

In other words, the experimental ΔT_c^{sf} curves contain, besides the contribution $\Delta T_c^{sf}(V)$, also a contribution $\Delta T_c^{sf}(Ti)$, which is shown schematically by the dash-dot line in Fig. 2. This shows once more that the anomalies described above are due to LSF.

It is interesting to note that the theoretical estimates $T_{c\,max}^{bs} = 12°K$ in Ti-V alloys, made back in 1961 [4], are in full agreement with our results.

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CROSS SECTION RATIO OF THE REACTIONS $He^4(\gamma, p)H^3$ AND $He^4(\gamma, n)He^3$ IN THE REGION OF GIANT RESONANCE, AND CHARGE SYMMETRY

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A number of recent publications, by Berman, Fultz, and Kelly [1] and by Berman, Firk, and Wu [2] have been devoted to the reaction $He^4(\gamma, n)He^3$ in the γ-quantum energy range from threshold to 32 MeV. Berman et al [1, 2], using their own data on the total cross section of this reaction and the cross sections given by others [3 - 5] for the (γ, p) reactions, have calculated their ratio as a function of the γ-quantum energy. The average ratio for giant resonance turned out to be 2.0.

Berman et al. used the expressions of Barker and Mann [6], which connect the ratios of the cross sections of these reactions with the amplitudes characterizing the states with isospin T = 0 and T = 1

$$\frac{\sigma_p}{\sigma_n} = \frac{P_p(E_p)}{P_n(E_n)} \left| \frac{a_1 + a_0}{a_1 - a_0} \right|^2$$

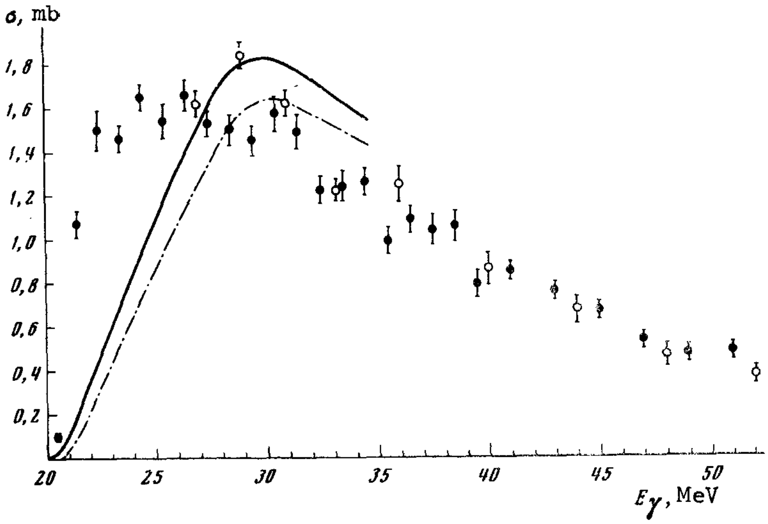

Fig. 1. Total cross section for (γ, p) and (γ, n) reactions (our data): o - (γ, n) reaction, • - (γ, p) reaction. The errors are statistical

where σ_p and σ_n are the total cross sections, $P_p(E_p)$ and $P_n(E_n)$ are the penetrability coefficients, and a_0 and a_1 are the isospin amplitudes. They found that the admixture of states with T = 0, according to their data, amounts to 17 - 20%. They investigated also the possible appearance of an admixture as a result of Coulomb interaction and as a result of the contribution of higher-order multiples (e.g., E2 absorption). The analysis has shown that the contribution of the admixtures due to these effects is small, and it is therefore concluded that such a large difference in the cross sections probably indicates violation of the charge-symmetry principle [7].

The results obtained by Berman et al., however, differ significantly from the data of Gorbunov [3] and of the recently published paper by Dodge and Murphy [8].

We have determined the cross sections for both reactions under identical physical conditions and with good statistics, in the γ-quantum energy interval 24 - 120 MeV for the (γ, n) reaction and from threshold to 120 MeV for (γ, p) [5]. The details concerning the corrections for all the errors in the calculation of the cross section for the (γ, n) reaction in the 24 - 34 MeV interval on the basis of 2964 processed events will be described in a detailed article. Figure 1 shows the reaction cross sections as functions of the γ-quantum energy. We see that the reaction cross sections agree well with one another. Figure 2 shows the energy dependence of the cross-section ratio. The mean values of the cross-section ratio according to our data and according to results of [3, 8]

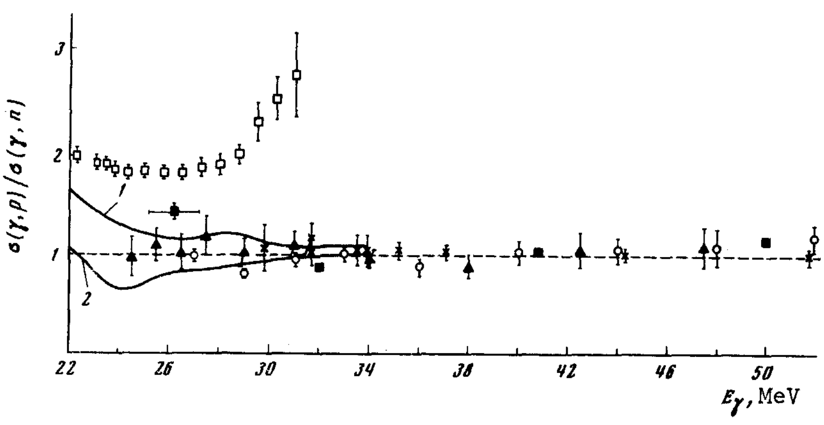

Fig. 2. Energy dependence of cross-section ratio: o - our data, ▲ - [3], × - [8], ■ - Busso et al., □ - Berman et al. Solid and dashed curves - [7].

are 1.2 ± 0.05 for the energy interval 24 - 30 MeV and 1.0 ± 0.03 for 24 - 52 MeV.

We can draw the following conclusion: The ratios of the (γ, p) and (γ, n) reaction cross section obtained by us as well as by Gorbunov and by Dodge and Murphy differ insignificantly from unity, a fact that can be attributed, according to Londergan and Shakin [7], to a number of factors not connected with violation of the charge symmetry of the nuclear forces.

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EXPERIMENTAL INVESTIGATION OF THE MECHANISM OF THE (π^-, π^-p) REACTION ON Al^{27} AT SMALL MOMENTUM TRANSFERS TO THE NUCLEUS

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Continuing our cycle of studies of the mechanism of proton knock-out from nuclei by π^- mesons with momentum 1 GeV/c [1 - 4], we have measured the characteristics of the reaction

$$\pi^- + Al^{27} \to \pi^- + p + Mg^{26*} \tag{1}$$

at momentum transfers $q \lesssim \sqrt{2M\varepsilon}$, where ε is the proton binding energy in the nucleus and M is the reduced mass of the proton and of the remainder of the nucleus. The formulation of the problem and the apparatus are perfectly analogous to those described earlier [1]. The resolution attained in the earlier experiments ($\Delta\varepsilon_{exc} \simeq \pm 20$ MeV, $\Delta q \simeq \pm 10$ MeV/c), which did not make it possible to separate the levels of the nuclear remainder from the excitation energy spectrum, dictated the choice of the investigated nucleus. The previously investigated (π^-, π^-p) reaction on Li^6 and C^{12} led to formation of a residual nucleus in the ground state and in low excited states. It would be of interest to determine whether the mechanism of the reaction is altered if the nucleus is produced only in excited states. The choice of Al^{27} was governed by the fact, seen from work on inelastic knockout of protons, i.e., from the study of the reaction (p, 2p) on Al^{27}, that the ground state of the residual nucleus Mg^{26} remains practically unexcited. The experimentally measured [5] peaks have the following positions on the excitation-energy scale: $\varepsilon_{exc} \sim 5.8$ MeV ($\ell = 0$) with width 5.5 MeV and $\varepsilon_{exc} \sim 11.3$ MeV ($\ell \neq 0$) with width 9 MeV. The excitation-energy spectrum obtained in the present study for the residual nucleus Mg^{26*} agrees with the data of [5 - 6].