$n \geq 2$ practically all the plasma electrons fall on the "Born tail" of the inelastic-collision cross sections. Formally this corresponds to satisfaction of the condition $\beta_0 < 1$ and to validity of the approximation (3) - (4).

In conclusion, we present numerical estimates for the ionization of a Ca plasma. In the case of the two outer shells of Ca (10 electrons) the mean value of n is of the order of 2.5 - 3. We consequently obtain from (12) $T \leq 80I_H$ and $z \simeq 6 - 7$.

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RECONSTRUCTION OF Λ-N INTERACTION FROM THE EXACT SOLUTION OF THE FADDEEV EQUATIONS FOR HYPERTRITIUM

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Information on Λ-N interactions is obtained presently from Λ-N scattering at low energies and from the binding energies of light hypernuclei. However, experiments on Λ-p scattering (measurement of the total cross section) does not make it possible, because of the large experimental errors, to determine even the scattering length and the effective radius in the Λ-N interaction. The Λ-N interaction information extracted from the binding energies of the light hypernuclei depends strongly on the model assumptions that must be made in the calculations of many-particle systems.

The most complete analysis of the aggregate of experiments on elastic Λ-N scattering and the binding energies of the hypernuclei were made by Herndon and Tang [1]. Their analysis was based on the following assumptions: 1) the binding energy of the hypernuclei is calculated by a variational method, 2) in the determination of the Λ-N potential depths it is assumed that the motion of the Λ particle in the light hypernuclei can be represented as motion in a certain single-particle potential. The nucleon-nucleon potentials were chosen such as to be reproduce satisfactorily the parameters of the effective-radius theory in n-p scattering.

As the result of the analysis, it was concluded in [1] that for an optimal description of the Λ-N scattering and of the binding energies of the hypernuclei ${}_\Lambda H^3$, ${}_\Lambda H^4$, ${}_\Lambda He^4$, and ${}_\Lambda He^5$ it is necessary to introduce into the Λ-N potentials a repulsive core of ∿ 0.6 F at an internal radius of about 2 F.

We present in this paper an analysis of the Λ-N interaction, based on a numerical so-

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lution of the Faddeev equations for hypertritrium.

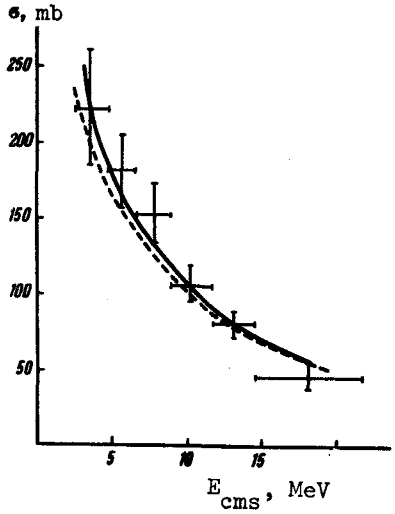
The problem is formulated in the following manner: the parameters of the Λ-N interaction are chosen such as to reconstruct: 1) the experimental value of the hypertritium binding energy, and 2) the variation of the Λ-p scattering cross section at low energy.

The calculation was carried out with central potentials of the Morse type

$$V_m(r) = V_m\left[e^{-2(r-r_m)/a_m} - 2e^{-(r-r_m)/a_m}\right], \tag{1}$$

where m = 1, 2, 3 stand for the triplet n-p, triplet Λ -p, and singlet Λ-p interactions. Only the s-state of the relative motion of each pair of particles was taken into account. The parameters of the potential $V_1(r)$ were chosen such that the experimental variation of the triplet scattering phase was reconstructed in the range from zero to 400 MeV.

In solving the Faddeev equations, we constructed the two-particle t-matrices (off the mass shell) for the Λ-N and N-N interactions by the method described in [3]. In this case, the third approximation was sufficient for the t-matrix describing the Λ-N interaction. It should be noted that the t-matrix of the N-N interaction, used by us in the calculation for



The solid curve corresponds to set II (see the table). The dashed curve corresponds to set I. The experimental points were taken from [4].

Type of potential		V_m, MeV	a_m, F	r_m, F	r_r, F	Scatt. length, F	Eff.rad.,F	β_1	β_2	β_3
$V_m^I(r)$	m = 2	56.55	0.3034	0.7602	0,551	– 1,416	3,121	0	1.3	5,4
	m = 3	70,45	0,3098	0,8648	0,651	– 2,884	2,857	–	–	–
$V_m^{II}(r)$	m = 2	61,55	0.3034	0.8602	0,651	– 1,633	3,462	–	–	–
	m = 3	69,83	0,3098	0,8648	0,651	– 2,796	2,882	–	–	–
H.T. E	singl.	–	–	–	–	– 2,16 ± 0,36	3,15 ± 0,21	–	–	–
	tripl.	–	–	–	–	– 1,60 ± 0,15	3,61 ± 0,17	–	–	–
H.T. F	singl.	–	–	–	–	– 2,09 ± 0,37	3,15 ± 0,23	–	–	–
	tripl.	–	–	–	–	– 1,84 ± 0,20	3,34 ± 0,17	–	–	–

Note. The meaning of the parameters β_i can be found in [3].

hypertritium, describes not only the triplet s-phase, but also leads to a binding energy of 9.12 MeV for the ordinary tritium.

The table lists the sets of the Λ-N potential parameters leading to best agreement between the data on the cross section for elastic Λ -p scattering with a value B_Λ = 0.18 MeV for ${}_\Lambda H^3$. The parameters of the effective-radius theory, obtained with these potentials, are compared with the optimal values given in [1].

The figure shows results of the calculation of Λ-p scattering in the effective-radius approximation for s-waves. The term that violates the isotopic invariance of the Λ-N interaction was not taken into account. The experimental values were taken from [4].

We note that when the repulsion radius is decreased it is impossible to reconcile the variation of the elastic Λ-p scattering cross section with the ${}_\Lambda H^3$ binding energy for any reasonable value of the Λ -N potential. (By repulsion radius we mean here the value of the radius $r_r = r_m - a_m \ln 2$ at which the potential (1) reverses sign.)

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SELF-REFLECTION OF ULTRASHORT LIGHT PULSES FROM CONDENSED MEDIA

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When a sufficiently intense light pulse of duration in the nanosecond range is incident on a condensed medium (either a metal or a dielectric), it should be totally reflected. The reason for this effect is that if the light-wave intensity is high enough the atoms of the medium should become rapidly ionized, within one or several periods of the wave (single ionization suffices), and an electron plasma with electron density $n_e = n_a$ is produced (n_a - density of the atoms in the medium). If the radiation wavelength is

$$\lambda > \lambda_p = 3{,}3 \cdot 10^{10} \cdot n_a^{-1/2} \qquad (1)$$

(λ is in microns and n_a in cm^{-3}), then the plasma turns out to be superdence and hence totally reflecting during the remaining part of the pulse, in which almost all the energy is contained[1]. Such a "reflecting state" will continue until the plasma recombines or expands and ceases to be superdense. It will be shown below that if the pulse duration is $\tau \lesssim 10^{-11}$ sec, such a reflecting state of the irradiated region of the medium can continue during the entire

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[1] We can apparently disregard the effect of nonlinear absorption in the narrow spectral interval $\lambda \approx \lambda_p$ (see [5]) and the nonlinear penetration of the wave into the superdense plasma (see [6]).