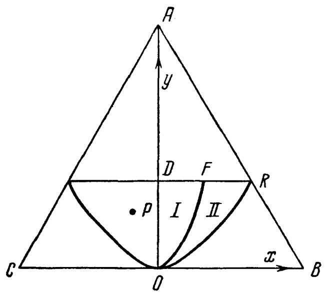
to a pure V covariant, i.e., $f_S = f'_S = f_T = f'_T = 0$ (and $f_V = f'_V$).

The decay probability may be written in the form form

$$W \sim \Phi(E_\pi, E_e)\, dE_\pi dE_e.$$

Theoretically, only the dependence of $\Phi(E_\pi, E_e)$ on E_e can be determined; the necessary calculations are contained in the work of Okun',[6] whose results are used below.

Let us represent the decays by points $P(x, y)$ inside an equilateral triangle ABC, such that the distances from P to AB, AC and BC are proportional to the energies of the electron, neutrino, and π meson respectively (see figure). The re-



gion allowed by the momentum conservation law is bounded by the straight line

$$y = E_{\pi\,(\max)} = (M_K - m_\pi)^2 / 2M_K$$

and the hyperbola

$$x = \sqrt{(y^2 + 2m_\pi y)/3}.$$

From the observed decays one obtains a certain distribution of points inside of this region. Then, according to the results of Ref. 6, the analysis may be carried out as follows:

1. It is first determined whether the distribution of decays is symmetric or not about the y axis. An asymmetry can occur only if both the S and T covariants are present simultaneously (with, possibly, admixtures of V).

2. If the distribution is symmetric then it may be "folded" relative to the y axis by replacing points P to the left of the y axis with points placed symmetrically relative to this axis; thus one need only consider the segment ROD. This segment is further divided into two parts of equal area, I and II, by the hyperbola $y = \frac{1}{2}\sqrt{(y^2 + 2my)/3}$ Let n(I) and n(II) denote the number of decays in regions I and II and let $\rho(x, y)$ denote the density of decays. Then:

(a) If $n(I) > n(II)$ we have the V covariant with possible admixtures of T or S; a pure V covariant is characterized by the vanishing of ρ on the hyperbola RO.

(b) If $n(I) < n(II)$ then the dominant covariant is T with possible admixtures of V; a pure T covariant is characterized by the vanishing of ρ on the y axis.

(c) If $n(I) = n(II)$ we have either the S covariant or a mixture of V and T; a pure S covariant is characterized by a ρ independent of x.

Let us point out the characteristic feature which indicates the presence of the V covariant: namely, it is the only covariant for which ρ does not vanish on the straight line DR.

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0 → 0 BETA TRANSITIONS WITH PARITY CHANGE

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THE possible variants of β-decay interaction have recently been undergoing a reexamination. Whereas in the past it has been considered experimentally established that the vector and axial-vector interactions do not contribute to β-decay, now the validity of these experiments is in doubt. Furthermore, if the universal theory of weak interactions proposed in Refs. 1 and 2 is valid, then only the A and V covariants contribute to β-decay.

As is well known, the spectrum of $0 \to 0$ (yes) transitions is given to a high accuracy by the Fermi spectrum, i.e., the correction factor C is energy independent. Only the tensor interaction fails to give the required spectrum shape; it has been necessary to explain the spectrum shape by introducing the pseudoscalar interaction and assuming $g_P \gg g_T$ (Ref. 3).

The purpose of the present note is to focus attention on the fact that the spectrum shape of $0 \to 0$ (yes) transitions is in good agreement with the A covariant (the V covariant does not contribute due to selection rules), and to derive expressions for the electron polarization and electron-neutrino correlation. The required formulae may be obtained from the corresponding formulae valid for the T − P covariant,[4] provided one replaces q by −q and $\lambda_P = -ig_P \int \gamma_5 / g_T \int \boldsymbol{\sigma}\cdot\mathbf{r}$ by $\lambda = -i \int \gamma_5 / \int \boldsymbol{\sigma}\cdot\mathbf{r}$, which now will be real:

$$C = \{(^1/_9 L_0 q^2 + M_0 - {}^2/_3 q N_0) + (2N_0 - {}^2/_3 L_0 q)\lambda + L_0\lambda^2\} \left| g_A \int \sigma r \right|^2, \quad (1)$$

$$\langle \sigma n \rangle = -C^{-1} \left| g_A \int \sigma r \right|^2 \{ {}^1/_9 q^2 \sqrt{L_0^2 - P_0^2} + \sqrt{M_0^2 - Q_0^2} + {}^1/_3 q (\sqrt{(L_0 + P_0)(M_0 + Q_0)} + \sqrt{(L_0 - P_0)(M_0 - Q_0)}) - (\sqrt{(L_0 + P_0)(M_0 + Q_0)} + \sqrt{(L_0 - P_0)(M_0 - Q_0)} + {}^2/_3 q \sqrt{L_0^2 - P_0^2})\lambda + \sqrt{L_0^2 - P_0^2}\lambda^2\} \sin(\delta_{-1} - \delta_1), \quad (2)$$

$$W_{ev}(\theta) = 1 + \langle \sigma n \rangle \cos\theta.$$

The term $L_0q^2/9 + M_0$ in the correction factor C increases with increasing energy, whereas $-2qN_0/3$ decreases, so that, to an accuracy of 5%, the expression $^1/_9\, L_0q^2 + M_0 - {}^2/_3\, qN_0$ is constant. The expression $2N_0 - {}^2/_3\, L_0q$ is constant to within 2%. In the case of the T − P covariant the analogous quantities varied by a factor of 2 and by 40% respectively (for Pr^{144}). If we assume that the deviation from a Fermi shape does not exceed 5% then λ must satisfy $\lambda > 24$ or $\lambda < 3$ (the sign of λ is unknown). Under these conditions the electron polarization is practically indistinguishable from $-v/c$.

In conclusion I thank Prof. V. B. Berestetskii, B. L. Ioffe, and A. P. Rudik for discussions.

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CROSS SECTIONS FOR THE INELASTIC SCATTERING OF 4.5-Mev DEUTERONS BY CERTAIN LIGHT NUCLEI

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INELASTIC scattering of deuterons by atomic nuclei was studied essentially at two energy values: $E_d \sim 15$ Mev (Refs. 1 and 2) and $E_d \sim 9$ Mev (Refs. 3 to 5). There was hardly any investigation of inelastic deuteron scattering at lower energies.

When this investigation was started, it was known that the differential cross section of the (d, d′) reaction on Mg^{24} ($\Delta E = 1.37$ Mev, $E_d = 4.5$ Mev) scattering angle ($\vartheta_{lab} = 70°$) was 4 mbn/sterad.[6] One could conclude from the work of Khromchenko[7] that in many nuclei there is little probability for the (d, d′) reaction at $E_d \sim 4$ to 5 Mev, with the exception of Li^7. In the latter case the group of deuterons from the $Li^7(d, d')Li^{7*}$ reaction ($\Delta E = 0.476$ Mev), at $E_d \sim 3.7$ to 4.7 Mev and $\vartheta = 110°$, would be comparable in intensity with the group of deuterons elastically scattered from Li^7.

In this investigation we measured the differential cross sections for inelastic scattering of deuterons with $E_d \sim 4$ to 4.5 Mev from nuclei of Li^7, F^{19}, Na^{23}, Mg^{24}, and Al^{27}. A double-focusing magnetic analyzer[8] was used to sort the groups of inelastically-scattered deuterons. The deuterons were accelerated in the 72 cm cyclotron of the Institute of Nuclear Physics of the Moscow State University. To check the correctness of the identification of the deuteron group, the measurements were made at different energies E_d. The values obtained for the differential inelastic-scattering cross sections are given in the table for $E_d = 4.5$ Mev and $\vartheta_{lab} = 91°$.

The fourth and fifth columns of the table give the differential cross sections $d\sigma_{F_2}/d\Omega$ and the total cross sections σ_{E_2} for Coulomb excitation