The first term in (2) corresponds to the Dember effect,[4] the second to the odd photomagnetic effect,[5] and the third determines the variation of the Dember effect with the magnetic field. As to the fourth term, it describes the even photomagnetic effect in that form, in which it takes place in an isotropic semiconductor. If E is measured along a direction l perpendicular to **n**, and if l, **n**, and **H** are in the same plane, then this term signifies a simple dependence on the angle ϑ_0 between **n** and **H**, namely $L_4H^2 \sin 2\vartheta_0$, which was observed in polycrystalline specimens.[2]

The last term in (2) determines the presence of anisotropy in the even photomagnetic effect. L_5' vanishes in a completely isotropic specimen.

If **H** is perpendicular to **n** the isotropic portion of the even photomagnetic effect vanishes and the general expression for $E_l' = \frac{1}{2}[E_l(\mathbf{H}) + E_l(-\mathbf{H})]$ (l perpendicular to **H**) is written as

$$E_l'' = L_5' \sum_i n_i l_i H_i^2. \tag{3}$$

It follows from (3) that, at a sufficiently small magnetic field and a known orientation of the monocrystalline specimen axes, the change in the even photomagnetic effect makes it possible to determine the anistropic constant L_5'

In the particular case when **n** coincides with the direction of the principal diagonal axis, expression (3) becomes particularly simple

$$E_l'' = \frac{2\sqrt{2}}{9} L_5' H^2 \Big\{ \cos^2(\varphi - \varphi_0)\cos\varphi + \cos^2\left(\varphi + \frac{2}{3}\pi - \varphi_0\right)\cos\left(\varphi + \frac{2}{3}\pi\right) + \cos^2\left(\varphi + \frac{4}{3}\pi - \varphi_0\right)\cos\left(\varphi + \frac{4}{3}\pi\right)\Big\}. \tag{4}$$

Here φ_0 is the angle between **H** and l and φ is the angle of rotation of the specimen about **n**. The character of the dependence of E_l'' on φ, as obtained in Ref. 1, is very close to that given by (4)

It must be noted in conclusion that the first to indicate that anistropy in a semiconductor with cubic lattice is possible, in connection with the dependence of the resistance on the magnetic field, was Seitz,[6] who introduced a term analogous to the last term in (2).

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ON THE DETERMINATION OF THE COVARIANTS IN THE K_{e3} *DECAY*

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If all weak interactions are described by a universal A — V interaction as proposed by Gell-Mann and Feynman[1] and Marshak and Sudarshan[2] then the matrix element for the decay $K \to e + \nu + \pi$ should be of the form:[3]

$$M \sim GMf\,(\bar{\psi}_\nu p_K (1 + \gamma_5)\psi_e)$$

(in perturbation theory $f \sim \ln(\Lambda^2/M^2)$ where Λ is the cutoff parameter and M the nucleon mass; however, in general, f may be a function of the π-meson energy). Additional interest is raised thereby in the determination of the decay interaction.

For purposes of analysis the decay of the long-lived K_2^0 meson, $K_2^0 \to e^\pm + \nu + \pi^\mp$, is the most convenient since the presence of two charged particles permits a complete determination of the kinematics.

In the present note we propose to analyze the decay by a method analogous to the Dalitz analysis for the τ^+ decay,[4] on the assumption that the decay interaction is of the general form discussed by Pais and Treiman:[5]

$$M \sim \bar{\psi}_\nu (f_S + f_S'\gamma_5)\psi_e + \frac{ip_\mu^K}{M}\bar{\psi}_\nu\gamma_\mu(f_V + f_V'\gamma_5)\psi_e + \frac{p_\mu^K p_\nu^\pi}{M^2}\bar{\psi}_\nu\sigma_{\mu\nu}(f_T + f_T'\gamma_5)\psi_e.$$

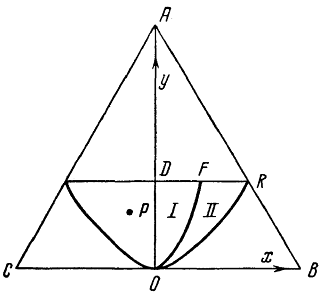
The Gell-Mann and Feynman scheme corresponds to a pure V covariant, i.e., $f_S = f'_S = f_T = f'_T = 0$ (and $f_V = f'_V$).

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 → 0 (yes) transitions is given to a high accuracy by the Fermi