absorption of photons of $\lambda = 1.06\ \mu$ and $\lambda = 0.53\ \mu$ by CH bonds in a strong field is also possible.

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S AMPLITUDES OF HADRONIC DECAYS OF BARYONS AND SU (6) SYMMETRY

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IN the present letter we examine the S-wave amplitudes of hadronic decays of baryons in the scheme of SU(6) symmetry, which was successfully introduced not long ago for the description of the static characteristics of strong and electromagnetic interactions of baryons and mesons [1-6].

The octuplet (b) and decuplet (d) baryons are incorporated in the representation $\underline{56}$ (B) of SU(6) and the octet of pseudoscalar mesons (P) and the nonet of vector mesons in the representation 35 (M) of the same group.

The transformation properties of the Lagrangian of weak interactions of hadrons (or the associated spurion) in SU(6) require that it transform according to the representation $\underline{35}$ and at the same time belong to the representation ($\underline{1}$, $\underline{8}$) of the group SU(2) ⊗ SU(3). It must furthermore be the sixth component of the octuplet of SU(3)[7,8]. Thus the unitary properties of the spurion are characterized by the tensor

$$H_\beta^\alpha = \delta_j^i h_B^A = \delta_j^i(\delta_2^A\delta_B^3 + \delta_B^2\delta_3^A). \qquad (1)$$

Here and below Greek indices of a tensor of SU(6) ($\alpha, \beta = 1, \ldots, 6$) correspond to the following pair of indices: lower case Latin letters denote tensor indices of SU(2) and capital Latin letters denote tensor indices of SU(3). For example $\alpha = (i, A)$, $\beta = (j, B)$, $\gamma = (k, C)$ etc.

Recognizing that

$$\underline{35} \otimes \underline{35} = \underline{1} + \underline{35a} + \underline{35s} + \underline{189} + \underline{280} + \overline{\underline{280}} + \underline{405}, \qquad (2)$$

$$\underline{56} \otimes \underline{56} = \underline{1} + \underline{35} + \underline{405} + \underline{2695}, \qquad (3)$$

and also the fact that on the right-hand side of Eq. (2) one of the representations $\underline{35}$ is antisymmetric with respect to a permutation of tensors and the other is symmetric, we obtain for the matrix element of the decay B → B + M.

$$M = B^{\alpha\beta\gamma}B^+_{\delta\beta\gamma}[f_1(M_\alpha^\varepsilon H_\varepsilon^\delta - M_\varepsilon^\delta H_\alpha^\varepsilon) + f_2(M_\alpha^\varepsilon H_\varepsilon^\delta + M_\varepsilon^\delta H_\alpha^\varepsilon)] + f_3 B^{\alpha\beta\gamma}B^+_{\delta\varepsilon\gamma}M_\alpha^\delta H_\beta^\varepsilon, \qquad (4)$$

where

$$B^{\alpha\beta\gamma} = \chi^{ijk}d^{ABC} + \frac{1}{3\sqrt{2}}[(2\varepsilon^{ij}\chi^k + \varepsilon^{jk}\chi^i)\varepsilon^{ABN}b_N{}^C + (\varepsilon^{ij}\chi^k + 2\varepsilon^{jk}\chi^i)\varepsilon^{BCN}b_N{}^A],$$

$$M_\beta^\alpha = i(q_\mu\sigma_\mu)_j{}^i P_B{}^A(q) \,/\, |q|.$$

Here χ^i and χ^{ijk} are a first-rank spinors and a symmetrical third rank spinor, respectively. ϵ^{ij} and ϵ^{ABC} are completely antisymmetric tensors of SU(2) and SU(3). σ_μ is a Pauli matrix ($\mu = 1, 2, 3$) and unit matrix, ($\mu = 4$); q_μ is the 4-momentum of the meson ($|q|^2 = q_0^2 - q^2$). We do not include the vector mesons in M_β^α as we will not be concerned with them. SU(6) symmetry has meaning strictly speaking only in the static limit [6], and therefore we examine only the S-wave amplitudes.

The requirement of CP invariance [7,8] of expression (4) gives

$$(f_2)_S = (f_3)_S = 0.$$

From this it follows that the S-wave amplitude $\Sigma^+ \to n\pi^+$ decay is zero[1)] since this decay, as is easily seen, is due only to the term with f_3 ($\underline{405}$). In this manner we find for the first time a theoretical explanation of the well-known experimental fact of absence of an asymmetry in the decays $\Sigma^+ \to n\pi^+$ and $\Sigma^- \to n\pi^-$. SU(6) symmetry distinguishes between the two possibilities dictated by experimental evidence, predicting pure p-wave in the decay $\Sigma^+ \to n\pi^+$. This can be checked experimentally [9]. Since expression (4) contains only one undetermined constant we find the following relationships between the S-amplitudes of all hadronic decays of baryons ($b \to b\pi$, $d \to d\pi$):

$$(\Lambda \to p\pi^-)_S = -(\Xi^- \to \Lambda\pi^-)_S = \sqrt{3/2}(\Sigma^- \to n\pi^-)_S$$
$$= -\sqrt{3}(\Sigma^+ \to p\pi^0)_S = \frac{1}{\sqrt{2}}(\Omega^- \to \Xi^{0*}\pi^-)_S. \quad (5)$$

From (4) naturally, there also follow the relations connected with the rule $|\Delta I| = 1/2$

$$(\Xi^- \to \Lambda\pi^-) = -\sqrt{2}(\Xi^0 \to \Lambda\pi^0),$$
$$(\Lambda \to p\pi^-) = -\sqrt{2}(\Lambda \to n\pi^0),$$
$$(\Omega^- \to \Xi^0\pi^-) = -\sqrt{2}(\Omega^- \to \Xi^{-*}\pi^0).$$

Equations (5) satisfy the triangle relation between the amplitudes for Λ^-, Ξ^- and Σ^- decays found in several articles [10,11,7] and agree with experiment [12] 2).

SU(6) symmetry with the help of (5) fixes a relation between the projections of this triangle on the S axis. Within the limit of experimental error (5) does not contradict the given data although a final decision may be made only by appreciably improving the measurements of the parameters of hadronic decays of hyperons (particularly the parameter γ of the decay $\Sigma^+ \to p\pi^0$).

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1)This result becomes clear if one thinks in terms of quarks: the strange quark Λ_0 cannot give rise to a π^+ meson regardless of whether the quark is in a symmetric state (baryons described by representation 56) or an antisymmetric state (baryons described by representation 20). The quark picture is inapplicable to the p-wave amplitude, which violates SU(6).

2)It is interesting to note that in[10, 11] in order to find this relationship it was necessary to assume that $(\Sigma^+ \to n\pi^+)_S = 0$. For $(\Sigma^+ \to n\pi^+)_P = 0$ there is a different relation between the S and P amplitudes of the triangle, disagreeing with experiment.

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TRANSFORMATION OF A METAL INTO A DIELECTRIC AND SINGULARITIES OF THE ELECTRICAL CHARACTERISTICS OF METALS IN STRONG FIELDS

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1. It is well known that metals with equal numbers of electrons n_e and holes n_h can exist only owing to the overlapping of bands. From Fig. 1., in which the shaded areas indicate filled states, it is clear that a shift of the band boundary by an amount $\delta\epsilon$ equal or greater than $\Delta\epsilon = \epsilon_2 - \epsilon_1$ would transform at absolute zero a metal (a) into a dielectric (b) 1).

If the metal has not only one type of carrier (not one band), but $n_e \neq n_h$, then a shift of the boundary might "deplete" one of the bands (see also (2)). At the moment of disappearance of carriers from even only one band, all the elec-

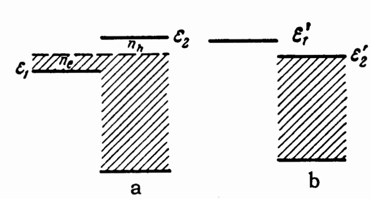

FIG. 1.