correlations should decrease with increasing energy. On the other hand, if an appreciable role is played by branching in the j-plane, then the correlation between the angular distributions of the resonance decay products may not tend to zero as $s \to \infty$.

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$K \to 2\pi$ DECAYS IN THE MODEL WITH ICOSUPLET WEAK COUPLING HAMILTONIAN

Rabi Madzhumdar and Dzhai Dev Anand
Nuclear Physics Research Institute, Moscow State University
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The possible existence of the so-called boson "icosuplet" was discussed by Lee, Okubo, and Schecter [1]. This idea was used later by Biswas, Bose, and Mathur [2], who showed that within the framework of SU(3)-symmetry theory, it is possible to introduce CP violation in the $K \to 2\pi$ decay by ascribing icosuplet transformation properties to the weak-interaction Hamiltonian. In this note, however, we consider a special case of K-meson decays, and we shall neglect effects of CP violation in the analysis. We thus ascribe to the weak-interaction Hamiltonian H_w the following transformation properties:

$$H_w \sim \{10\} + \{10^*\}. \tag{1}$$

We can hope that with this choice of the model Hamiltonian the $K^+ \to \pi^+\pi^0$ decay, which proceeds via a $\Delta T = 3/2$ spurion, calls for an additional analysis compared with the $K_1^0 \to 2\pi$ decay.

We wish to show in this note that it is possible in this case to obtain a connection between the probabilities of these decays. This connection is a generalization of the corresponding rule for $\Delta T = 1/2$. The corresponding spurions responsible for the $K \to 2\pi$ decay transform like states with $Y = -1$, $T = 1/2$ from {10} and like states with $Y = -1$, $T = 3/2$ from {10*}. Starting from the Hamiltonian (1) given above and from the CPT invariance requirement, we can immediately write out the required decay matrix elements [2]:

$$\langle K^+|H_w|\pi^+\pi^0\rangle = -(3/4\sqrt{2})\, a_{27} \exp(i\delta_2), \tag{2}$$

$$\langle K^0|H_w|\pi^0\pi^0\rangle = \langle \bar{K}^0|H_w|\pi^0\pi^0\rangle = [(1/20)a_{27} + (1/5)a_8]\exp(i\delta_0) - (1/2)a_{27}\exp(i\delta_2), \tag{3}$$

$$\langle K^0|H_w|\pi^+\pi^-\rangle = \langle \bar{K}^0|H_w|\pi^+\pi^-\rangle = -\sqrt{2}\ \{[(1/2)a_{27} + (1/5)a_8]\exp(i\delta_0) + (1/4)a_{27}\exp(i\delta_2)\}. \quad (4)$$

Here a_8 and a_{27} are the absolute values of the reduced matrix elements relating to the initial state of {8} with the final state of {8} and the initial state of {27} with the final state of {27} respectively. δ_2 and δ_0 are phases of $\pi\pi$ scattering in T = 2 and T = 0 states [3], calculated at an energy equal to the K-meson mass.

Neglecting CP-violation effects, we have

$$|K_1^0\rangle = (1/\sqrt{2})(|K^0\rangle + |\bar{K}^0\rangle); \quad (CP)H_w(CP)^{-1} = H_w$$

and, using (3) and (4), we obtain

$$\langle K_1^0|H_w|\pi^0\pi^0\rangle = \sqrt{2}\ \{[(1/20)a_{27} + (1/5)a_8]\exp(i\delta_0) - (1/2)a_{27}\exp(i\delta_2)\}, \quad (5)$$

$$\langle K_1^0|H_w|\pi^+\pi^-\rangle = -2\ \{[(1/20)a_{27} + (1/5)a_8]\exp(i\delta_0) + (1/4)a_{27}\exp(i\delta_2)\}. \quad (6)$$

Eliminating a_8 and a_{27} from (2), (5), and (6), we obtain the following sum rule relating the matrix elements of the decays

$$K \to 2\pi: \quad M(K_1^0 \to \pi^+\pi^-) + \sqrt{2}\,M(K_1^0 \to \pi^0\pi^0) = 2\sqrt{2}\,M(K^+ \to \pi^+\pi^0). \quad (7)$$

It is of interest to note that (7) is a generalization of the $\Delta T = 1/2$ rule. It is known from experiment [4] that the probability of the decay $K^+ \to \pi^+\pi^0$ is exceedingly small, namely $R(K^+ \to \pi^+\pi^0)/R(K_1^0 \to 2\pi) \approx 1/500$, so that if we neglect the right side of (7) we obviously return to the rule $\Delta T = 1/2$. A similar generalized rule was obtained also by others, namely Das and Mahantappa [5], Sudarshan [6], and somewhat later by Bose and Biswas [7] on the basis of current algebra. The sum rule obtained by us differs slightly from their results, but agrees with experiment and with the $\Delta T = 1/2$ rule.

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