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In [1,2] the hypothesis was suggested on general requirement of invariance of strong, electromagnetic and weak interactions only under time reversal T and it was shown that gauge invariance in quantum electrodynamics and isotopic invariance in meson theory lead to invariance of renormalizable interaction Lagrangians under space reflection P. Invariance under T of renormalizable and isotopically invariant Lagrangian of interaction of K-mesons with baryons does not lead to the conservation of parity. In connection with this the investigation of conservation of parity in production of K-mesons and hyperons represents some interest.

Let us consider [3] reaction $\pi + N \to Y + K$ with observation of the subsequent decay $Y \to N + \pi$ (Y is Λ or Σ hyperons). If in production of hyperon and K-meson, parity is not conserved then the vector of polarization of hyperon may be represented as follows:

$$\vec{P} = A\vec{n} + B\vec{p} + C\vec{q} \qquad (1)$$

where $\vec{n}$ is a unit vector normal to the production plane, and $\vec{p}, \vec{q}$ are unit vectors in the production plane $(\vec{p}\cdot\vec{q}) = 0$ A,B,C, are the functions of energy of initial π-meson and $\cos\gamma$, where γ is the angle between the direction $\vec{k}_0$ of initial π-meson and the direction of the hyperon. The transition matrix for the decay $Y \to N + \pi$ in the centre of mass system is

$$M = N + F\vec{\sigma}\vec{k} \qquad (2)$$

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1 V.G. Soloviev, JETP 33, 537, 796 (1957).
2 V.G. Soloviev, Nuclear Physics (in print).
3. T.D. Lee and C.N. Yang, Phys. Rev., 104, 254 (1956).

where N and F are complex numbers and k is a unit vector in the direction of the emitted π -meson.

The distribution of π -mesons from the decay of hyperons in the centre of mass system may be obtained in

$$w \sim (NN^* + FF^*) + (NF^* + FN^*)\cos\vartheta + + (NF^* + FN^*)(B\cos\varphi - C\sin\varphi)\sin\vartheta, \tag{3}$$

where $\cos\vartheta = (\vec{n} \cdot \vec{k})$, and φ is an angle between $\vec{p}$ and the projection of $\vec{k}$ to the production plane. It may be easily shown that the term, proportional to A is responsible for the up-down asymmetry to the plane of production.

Left-right asymmetry in distribution of the emitted π -mesons to the planes determined by $\vec{n}$ and $\vec{k}_o$ in each point of decay after integration under the angle ϑ may be obtained in

$$\frac{w_e}{w_r} = \frac{2(NN^* + FF^*) - (NF^* + FN^*)(B\sin\alpha + C\cos\alpha)}{2(NN^* + FF^*) + (NF^* + FN^*)(B\sin\alpha + C\cos\alpha)}, \tag{4}$$

where $\cos\alpha = (\vec{k}_0 \vec{p})$ (α depends on the angle γ).

From (3) it can be seen that the terms proportional to B and C lead as well to the forward-backward asymmetry in distribution of π -mesons to planes determined in each point of decay by vector n and by vector, situated in the production plane and normal to $\vec{k}_o$. This asymmetry may be written:

$$\frac{w_f}{w_b} = \frac{2(NN^* + FF^*) + (NF^* + FN^*)(B\cos\alpha - C\sin\alpha)}{2(NN^* + FF^*) + (NF^* + FN^*)(B\cos\alpha - C\sin\alpha)}. \tag{5}$$

Asymmetries in (4) and (5) in the system of hyperon at rest appear only in case when parity is not conserved in strong interaction at the production of K-mesons and hyperons. It is clear that the asymmetry must not disappear when integration over the angle γ is carried out.

It is desirable to analyze the experimental data obtained in [4,5] with the aim to discover the asymmetry mentioned above. Note that the similar asymmetries will appear in the distribution of π -mesons from the decay of hyperons, produced in the reaction $K^- + p \rightarrow Y + \pi$, if parity is not conserved in the interaction of K-mesons with nucleons and hyperons.

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4. F.S. Grawford et.a., Phys. Rev. 108, 1102 (1957).
5 F. Eisler et.al., Phys. Rev., 108, 1353 (1957).