occur with a characteristic transition time $T' = 2\pi\hbar/\Delta m' \approx 10^{-16}$ sec, a time that is appreciably shorter than the lifetime of K_1^0 and K_2^0-mesons.

The distance R from the K^0 particle source, at which the numbers of K^0 and $\tilde{K}^0$ particles become comparable, will no longer be of the order of centimeters, but of the order of 10^{-6} cm. The smallness of the distance R may lead to apparent violations of conservation of strangeness in processes resulting in the formation of strange particles. The formation of K^--mesons at energies below the threshold for the formation of K-meson pairs ($K^0 \to \tilde{K}^0$ transitions in vacuum and $\tilde{K}^0 - K^-$ transitions in matter) have been discussed by Lande *et al.*[10] who assumed that the time of the $K^0 \rightleftarrows \tilde{K}^0$ transition is close to τ_1. Accurate measurements of the mechanism of formation of K^--mesons in thin targets as a result of nuclear collisions of nucleons or π-mesons having energies below the threshold for K-meson pair formation could resolve the question of the time of the $K^0 \rightleftarrows \tilde{K}^0$ transition. This however presents certain difficulties connected with the fact that the nuclear range even in dense material is not only $\gg cT'$ but even $> cT$.

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Anomalous Decay of a Hypernucleus

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A CASE OF AN UNUSUAL decay of a hypernucleus has been observed in an emulsion chamber (Type "R" NIKFI film) exposed to cosmic radiation in the stratosphere.

The hypernucleus was emitted from a type $10+0n$ star and, after traveling a distance of 2930 μ, disintegrated in flight into three charged particles which were stopped in the emulsion chamber. A microphotograph of this event is reproduced in Fig. 1; the decay products are listed in the table below.

The masses of the decay products were determined by the grain density-range method (with reference to π-mesons). The charge and residual range of the hypernucleus in the emulsion, as determined from the δ-electron density along the residual path, proved to be $2e$ and $600 \pm 100\ \mu$, respectively.

Inasmuch as the mass of particle (2) proved to be $850 \pm 300\ m_e$, it was natural to assume that this particle is K-meson. On the other hand, inasmuch as the charge of the hypernucleus, which was determined with great accuracy, equals $2e$, it could be assumed that the K-meson is negative (the absence of decay products for the K-meson also points to its charge being negative).

The non-coplanarity of the decay products of the hypernucleus indicates the emission of at least one neutron, the energy of which was determined from the momentum vector diagram. Thus it may be assumed that the decay of the hypernucleus occurs according to the scheme

$$(\mathrm{He}_2^5)^* \to \mathrm{H}_1^1 + K^- + n + \mathrm{He}_2^3 + (103 \pm 5)\ \mathrm{Mev},$$

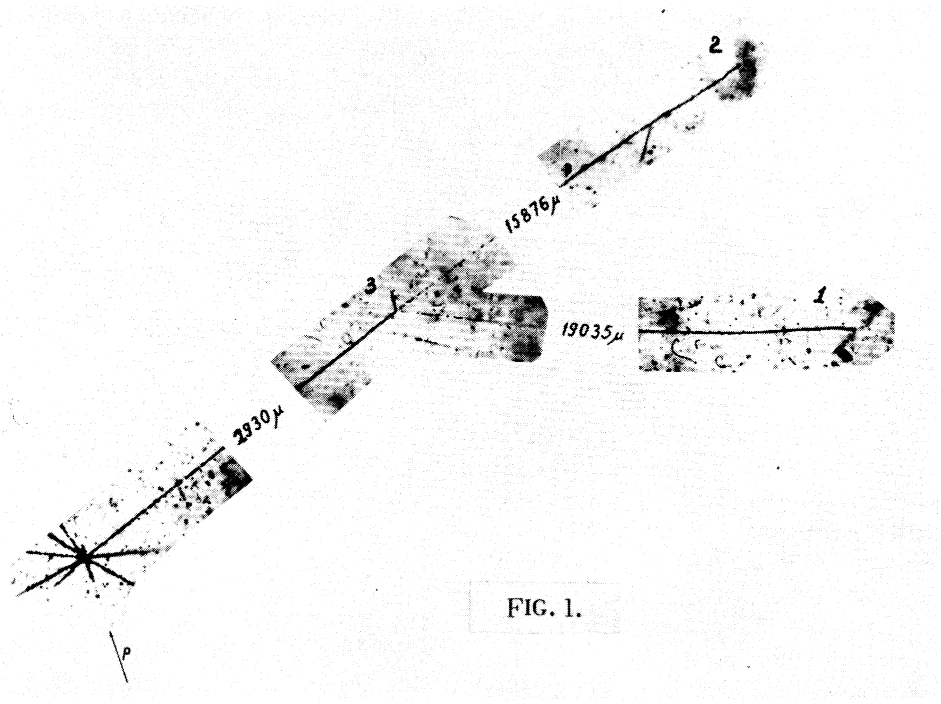

FIG. 1.

Track	Range, μ	Angle relative to hypernucleus track	Depth angle	Mass, m_e	Energy, Mev
1	19035	45°	1°	2100±700	76.0
2	15876	2°	40′	850±300	50.0
3	10	65°	5°30′	He_2^3	3.0
				He_2^4	3.2

or the scheme

$$(He_2^6)^* \rightarrow H_1^1 + K^- + n + He_2^4 + (110 \pm 6)\ \text{Mev}.$$

For determining the energies, the mass of the K-meson was taken as 966.7 m_e. If it be assumed that the decay of the hypernucleus occurs as a result of the decay of a bound hyperon, the mass of this hyperon would appear to be of the order of 3000 m_e.

The estimated lifetime of the hyperon is 5×10^{-11} sec.

A more detailed analysis of the described event is now being performed.

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