We note that, in the reactions (1) and (1′), the polarization vectors of the $_{\Lambda}He^5$ and Λ depend only on the vectors **P** and **n** and the relative parities of K and Λ. Therefore, a case of the reaction (1′) can be simply added in with the cases of reaction (1).

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EMISSION OF Λ^0 PARTICLES UPON CAPTURE OF K MESONS BY NUCLEI IN EMULSION

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An Ilford G-5 emulsion stack (each pellicle was 600 microns thick) was exposed at the Bevatron in Berkeley† to K^- mesons with a momentum near 300 Mev/c. In scanning this stack three Λ^0 decays were found in the immediate vicinity of σ_K stars (see Table I, events 1, 2 and 17). Similar events have been observed by others.[1-3] In this connection we attempted to establish a correlation between the parent event and the Λ^0 decay, when it was impossible to observe them in a single field of view of the microscope. The pellicles were area-scanned with a magnification of 225 in a strip 1.5 cm × 10 cm, in which practically all K^- mesons were expected to have been stopped. We recorded σ_K stars, two-prong stars, and all proton tracks starting in the pellicle and longer than 500 microns. The beginning of each track was examined under great magnification in order to find a second track of small ionization, if such exists. This was necessary since some two-prong stars might have been overlooked in scanning with low magnification because of the low sensitivity of the emulsion (g_{min} = 16 grains in 100 microns). All events in which the direction of the fast particle agreed with that of the beam were at once rejected as stars produced by π^- contamination in the K^- beam. The Λ^0 decays were picked out from the set of two-prong stars thus found. First we measured the proton range, the ionization of the fast particle, and the opening angle. Using these data one can select those stars for which the relation between proton momentum, pion ionization, and opening angle in the decay $\Lambda^0 \rightarrow p + \pi^-$ is satisfied. Following the track of the fast particle enables one to determine whether it is a π^- meson; from the range of this particle and the data obtained before one can compute the Q value. Thus 18 Λ^0 decays were found.

A search for parent events was made within cones, whose axes were in the direction of flight of the Λ^0 particles as determined from the proton and pion momenta; the vertex angle of the cones was 5°, and the heights were set by the boundaries of the scanned strip. Parent events were found for 13 Λ^0 particles.

The results of the measurements are given in Table I. Column 4 gives the angle $\Delta\varphi$ between the decay plane and the line joining the point of decay with the parent event; column 5 gives the projection of the angle between this line and the direction of flight of the Λ^0 particle upon the emulsion plane. As is evident from Table I, the actually observed spread of the angles $\Delta\varphi$ and $\Delta\alpha$ is less than the average value of the quoted errors. This is probably connected with the restrictions placed upon the magnitudes of $\Delta\varphi$ and $\Delta\alpha$ in selecting the parent events. For example, if one considered only those events for which $|\Delta\alpha| \leq \sqrt{D}$, where $\sqrt{D}$ is the rms error in the determination of the direction of flight of the Λ^0 particles, then such a "cutoff" leads to $|\overline{\Delta\alpha}| \approx 0.3\sqrt{D}$; a Gaussian distribution of errors is assumed here.

The type of the parent event is given in column 6.

As is evident from Table I, for five events no parent σ_K star was found. The pertinent Λ^0 particle might have been formed in a nuclear explosion produced outside the scanned region by a stopped K^- meson. Nor can we exclude that the parent σ_K star was not found because of nuclear scattering of the Λ^0 particle. Moreover it is possible that the parent event lies outside the scanned cones.

For 18 identified Λ^0 particles (the total volume of the cones was 0.17 cm^3), one could anticipate 4 spurious parent events. In fact one such event was found. Of course, to reduce the number of spurious events one should decrease the density of exposure.

Results of treating the Λ^0 particles

Decay event number	Q[1] Mev	Kinetic energy[1] of Λ^0 Mev	$\Delta\varphi$,[2] degrees	$\Delta\alpha$,[2] degrees	parent event
1	38.3	3.0	0.8±5.5	2.0±2.9	σ_K
2[3]	42.0	20.9	1.0±2.6	0.5±2.8	σ_K
3	36.0	13.1	1.6±2.3	1.5±1.9	σ_K
4	36.4	10.1	0.2±1.5	0.5±2.1	σ_K
5	38.2	14.5	0.9±1.5	0.0±2.7	ρ_K[6]
6[4]	40.0	48	0.1±2.0	1.5±2.2	σ_K
			1.2±2.0	2.2±2.2	ρ_K[6]
7	38.3	4.9	1±5	0.0±2.1	σ_K
8	37.5	12	1±2.0	0.5±2.1	σ_K
9	38.9	8.8	0.5±1.9	1.5±2.3	ρ_K[6]
10[5]	37.5	3.4	—	—	—
11[5]	36.8	0.9	—	—	—
12[5]	36.5	10.1	—	—	—
13	36.6	6.0	0.4±1.5	0.8±4.5	σ_K
14[5]	37.1	18.4	—	—	—
15	38.2	35.5	2±2.4	2.5±2	ρ_K[6]
16	38.7	23.2	1.7±2.0	2±1.7	σ_K
17	38.3	7.3	2.1±2.5	2.5±2.6	σ_K
18[5]	38.1	10.13	—	—	—

[1]The errors in the energies are 1 to 2 Mev.

[2]Emulsion shrinkage was not considered in estimating the errors for events 1, 2, and 17, since the Λ^0 decay and the parent event were observed in the same pellicle.

[3]The energy of the π^- meson was estimated from the ionization.

[4]This event has two possible parent events. The energy of the π^- meson was estimated from the ionization.

[5]The parent event (σ_K, ρ_K) was not found.

[6]The mass was determined from multiple scattering and ionization.

One may expect that a juxtaposition of the Λ^0 decays with the parent events will be helpful in the investigation of the diverse types of nuclear interactions associated with the production Λ^0 particles and in the study of the properties of the Λ^0 particles themselves.

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MEASUREMENT OF THE POLARIZATION OF (D + T) — NEUTRONS AT DEUTERON ENERGIES OF 1800 kev

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THE reaction $T(d, n)He^4$ at energy of the deuterons of $E_d = 107$ kev passes through the $3/2^+$ level of the He^5 nucleus, formed by s-deuterons. Consequently, the neutrons obtained at this energy cannot be polarized. At $E_d = 2$ Mev, a significant contribution (about 50%) of the higher states is observed. This is confirmed by the deviation of the total cross section from the Breit-Wigner formula for a single level, and also by the appearance of anisotropy in the angular distribution of reaction products.[1] It is of interest to explain the degree of polarization of the neutrons in this very important reaction.

Measurement of the polarization of (D + T)