Angular Correlations in V^- Type Decays.

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Summary. --- Measurements have been made on 34 V^- events produced by cosmic ray particles in the lead plates of a cloud chamber, and the angular correlation between the production and decay planes has been studied. If one limits the analysis to the V^- particles produced in interactions in which only a small number N_h of heavily ionizing particles is seen to be emitted, a correlation is found in favour of small angles, whereas for large N_h the correlation appears to vanish.

1. - Introduction.

It is well known that a study of angular correlations may help to shed some light on the spins of the new, heavy, unstable particles. Even though it is now generally believed that the metastability of these particles can be explained by selection rules of the type proposed by Gell-Mann and Pais (1) instead of by the very high spins previously proposed by Fermi and Feynman (2), a knowledge of their actual spins is nevertheless of considerable importance.


(2) E. Fermi and R. P. Feynman: as cited by M. Gell-Mann and A. Pais, see (1).
ANGULAR CORRELATIONS IN $V^0$ TYPE DECAYS

Workers at Brookhaven (8) have studied $V^0$-particles produced in hydrogen by the pion beam of the Cosmotron, and have found indications of a spin greater than $\frac{1}{2}h$ for the $\Lambda^0$ (*). However, in various experiments (7) in which the $V^0$-particles were produced in heavy nuclei by cosmic rays, no clear evidence has yet been forthcoming. It has been suggested (5) that scattering within the nucleus may account for this difference.

In an earlier paper (5) we have given preliminary results of a study of angular correlations which was based on 24 events. We have now found a total of 34 events and our new statistics have confirmed our previous conclusions; final results are given in the present paper.

2. Experimental procedure.

All the events have been found in a multiplate chamber having useful dimensions of $70 \times 70$ cm with an illuminated depth of 20 cm. Three different arrangements of lead plates have been used: (a) 2 cm thick plates with 6 cm of free space between the plates, (b) 1.5 cm thickness and 6 cm of free space, and (c) 1 cm thickness and 3 cm of free space: most of the events were obtained while using arrangements (b) and (c). The events have been reconstructed by reprojecting the two stereoscopic photographs onto a fixed plane corresponding to the front of the lead plates. The actual positions and angles of the tracks were then calculated from the projected positions and angles by means of a purely analytical procedure (+). The correlation looked for was that between the plane containing the incoming primary and the outgoing $V^0$-particle (production plane) and that containing the two decay products (decay plane).

In general, the only useful events were those in which the primaries were ionizing, but to these have been added events produced by neutral particles

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(*) Note added in proof. — See also recent work by W. D. Walker and W. D. Shepard: in course of publication.


(+) By using the G1 Electronic Computer of the Max-Planck-Institut für Physik at Göttingen.