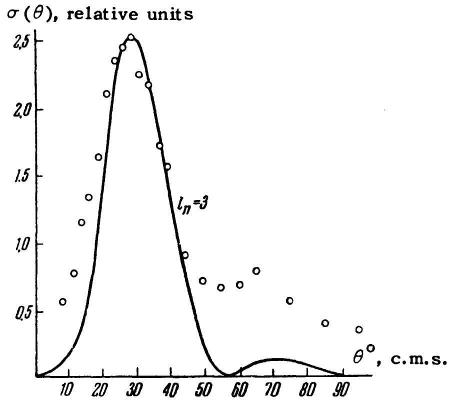

FIG. 1

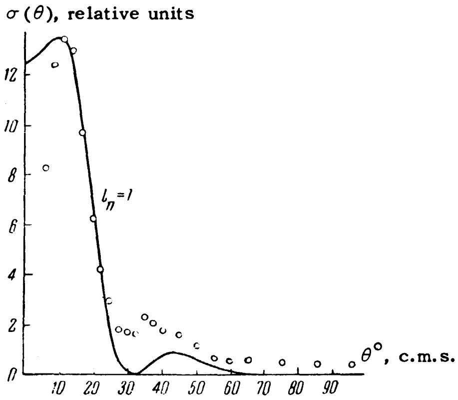

FIG. 2

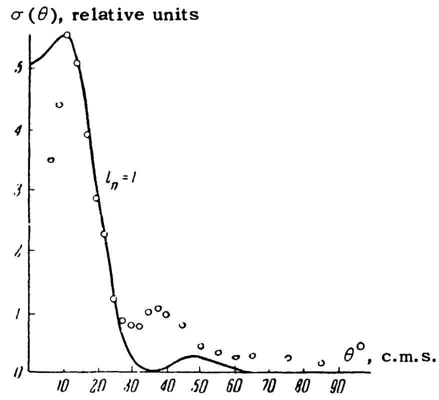

FIG. 3

calculating the angular distributions the interaction radius was chosen to be 6×10^{-13} cm. The values found for the spin and parity of the ground state, and also for the energies, spins and parities of the excited states are in agreement with data of previous works.[9,10]

The narrowing of the peaks of the experimental angular distributions in Figs. 2 and 3 can be related to the effect of nuclear interaction. The displacement of the peaks towards smaller angles, required in this case by the theory and observed by Teplov and Yur'ev[6] at low deuteron energies, becomes completely insignificant already for deuteron energies $E_d = 7$ Mev[10] and 8 Mev,[9] and it may be expected that it will be even smaller at higher energies. At the same time, for deuteron energies of 8 Mev, the experimental distribution of the group with $l_n = 1$ turned out to be the same as the theoretical one in the small-angle region.[9]

It should be noted that the "background" (isotropic part of the angular distribution) is less at 13.6 Mev than at 7 and 8 Mev, indicating the growing role of direct interaction with increasing energy.

In conclusion, the authors would like to express their gratitude to Prof. M. V. Pasechnik for his constant interest in the work, Yu. A. Bin'kovskiĭ for preparation of the targets, and also to the personnel of the cyclotron crew who made possible the continuous operation of the cyclotron.

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CROSS SECTION FOR THE FORMATION OF Ω^- PARTICLES IN THE REACTIONS $\pi^- + p \to \Omega^- + 3K$ AT 8 Bev AND $p + \bar{p} \to \Omega + \bar{\Omega}$ AT 4 Bev

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Submitted to JETP editor September 30, 1959

J. Exptl. Theoret. Phys. (U.S.S.R.) **38**, 289-290 (January, 1960)

ACCORDING to the Gell-Mann scheme, a hyperon can exist with strangeness -3 and isotopic spin zero.[1] We take the lower bound of its mass to be $M_\Xi + M_\pi$, and the upper bound to be $M_\Xi + M_K$, that is, its mass is located between 1.58 and 1.93 M_N. In this note, the cross section for the formation of Ω^- particles in the collisions of $\pi^- p$ at 8 Bev and $p\bar{p}$ at 4 Bev is estimated in the statistical model.

According to the statistical model of multiple production of particles, the probability of the formation of n particles in the final state is[2]

$$S_n = [V/(2\pi)^3]^{n-1} f_{TS} W(E_0), \tag{1}$$

where V is the spatial volume in which the particles are produced; f_{TS} is the statistical weight, taking account of the spin and isotopic spin of the particles in the final state; $W(E_0)$ is the phase-space volume for a total center-of-mass energy E_0. For comparison with experiment we use Barashenkov's hypothesis[3] that the pions and baryons are formed in the volume V_π, but that the K mesons are produced in a smaller volume V_K ($\xi = V_K/V_\pi = 0.0232$). If there are k K mesons in the final state and $-l\,(k+l=n)$ pions and baryons, then V^{n-1} in (1) must be replaced by V_1^{n-1}:

$$V_1^{n-1} = \frac{(k+l\xi)\,\xi^{k-1}}{n}\,V^{n-1}. \qquad (2)$$

From (1) and (2) we obtain the following relations between the cross sections for 8 Bev pions:

$$(\pi^- + p \to \Omega^- + 3K)/(\pi^- + p \to 2K + \overline{K} + \Sigma) = 3.3\cdot 10^{-2}, \quad (3)$$

$$(\pi^- + p \to \Omega^- + 3K)/(\pi^- + p \to \Xi + 2K) = 4.3\cdot 10^{-3}, \quad (4)$$

$$(\pi^- + p \to \Omega^- + 3K)/(\pi^- + p \to \pi + N) = 0.86\cdot 10^{-4} \quad (5)$$

and for 4-Bev antiprotons

$$(p + \bar{p} \to \Omega + \bar{\Omega})/(p + \bar{p} \to \Xi + \bar{\Xi}) = 0.43. \quad (6)$$

It is assumed in the calculation that the particles in the final state are nonrelativistic. Since the results in the statistical theory depend strongly on the choice of the volume V, the calculated ratio (3) is more reliable, since it does not depend on V.

If we use the experimental data on the cross section of the reaction $\pi^- + p \to \pi + N$ for π^- energies ~ 8 Bev ($\sigma \sim 6$ mb),[4] we get for the reaction $\pi^- + p \to \Omega^- + 3K$ at the same energy $\sigma \sim 0.5\ \mu b$.

The cross section for $\pi^- + p \to \Xi + 2K$ is obtained as $\sigma \sim 120\mu b$. This value is significantly larger than the experimental one,[5] which has $\sigma = 2.3^{+3.5}_{-1.6}\ \mu b$ for 5 Bev negative pions. It is possible, therefore, that the absolute values of the cross sections calculated above for the production of Ω^- particles are overestimates. Since at present only two cases of Ξ^- obtained in an accelerator are known, it seems natural from (4) that the Ω^- particle has not yet been observed, if indeed it even exists.

On the basis of formula (6), searches for Ω^- and other possible heavier hyperons can be usefully made in reactions involving nucleon-antinucleon collisions.

The author thanks Prof. M. A. Markov for setting up the problem and Chou Kuang Chao and V. S. Barashenkov for valuable remarks.

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Translated by W. Ramsay
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MEASUREMENT OF THE ANGULAR CORRELATIONS OF 298 — 880 kev AND 298 — 966 kev GAMMA CASCADES OF Dy^{160}

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Submitted to JETP editor September 30, 1959

J. Exptl. Theoret. Phys. (U.S.S.R.) **38**, 290-291 (January, 1960)

THE decay of Tb^{160} and the decay scheme of the Dy^{160} nucleus have repeatedly been investigated by various methods, with particular detail in references 1 — 6.

It can be assumed that the sequence of the most intense γ transitions and the spins and parities of the normal and excited states of Dy^{160} with energies 86, 283, 966 kev (the figure shows the corresponding part of the decay scheme of Dy^{160}) have been reliably established. The information on the spins and parities of the other levels is contradictory. To the level with energy 1264 kev there is assigned a spin 3^-,[1,2] 4,[3] and 2^-.[4-6]

Bertolini and his co-workers[3] measured the an-