HYPERON PRODUCTION BY 3, 3.5 AND 5 GeV/c K^+ MESONS

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(Presented by F. MULLER)

We report here preliminary results on hyperon production by positive kaons, through reactions of the following type:

$$K^+ + p \rightarrow KKY\,(\pi).$$

The experiment was performed at CERN, in the Saclay bubble chamber exposed to beams of 3, 3.5 and 5 GeV/c K^+-mesons, with low π-contamination (less than 5%).

The cross sections for the various reactions are as follows (Table). It is seen that the cross sections, approximately equal at 3 and 3.5 GeV/c seem to increase when the momentum goes up to 5 GeV/c, but not spectaculary.

The KK ($S = 2$, $B = 0$, $Q = 2$ or 1) mass for the three body reactions at the two neighbouring momenta 3 and 3.5 GeV/c, is presented in Fig. 1.

An important bump is seen in the mass-range 1200—1350 MeV/c^2, its statistical significance is about three standard deviations. Unfortuna tely I do not have a slide for plot, but the KY mass-spectra do not show any significant structure.

The similar KK mass-spectrum for the 4-body reactions is presented in Fig. 2.

Here the interpretation of the enhancement at low massvalues is more delicate, since

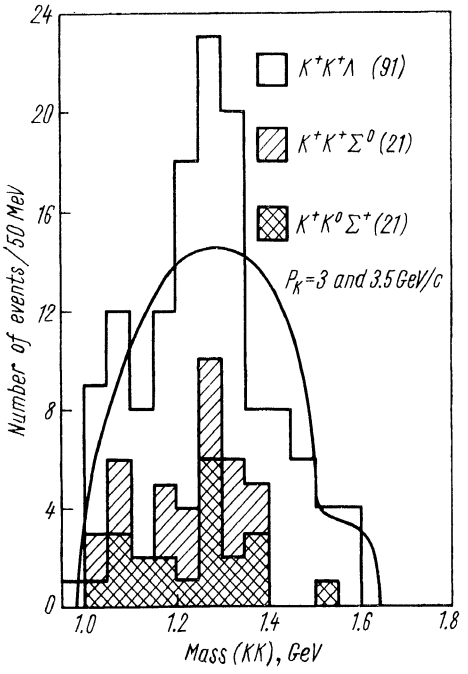

Fig. 1.

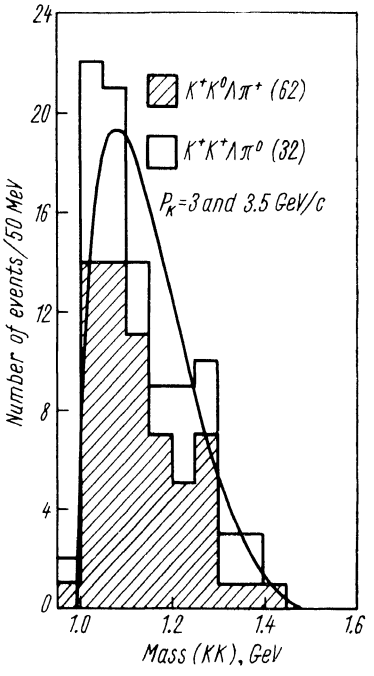

Fig. 2.

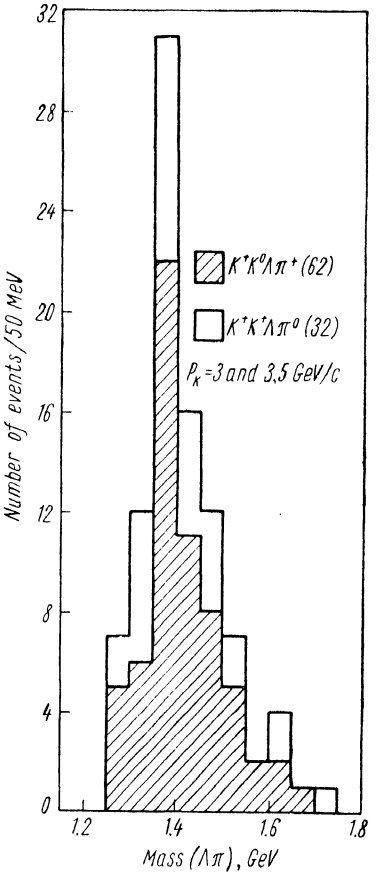

Fig. 3.

Lab. momentum, GeV/c	3	3.5	5
C. M. energy, GeV/c	2.61	2.78	3.25
$KK\Lambda^0$	25 ± 5		50 ± 15
$KK\Sigma^0$	5 ± 2		
$K^+K^0\Sigma^+$	~10		
$K^+K^+\Lambda\,(\pi^0)$	7 ± 2		15 ± 8
$K^+\,(K^0)\,\Lambda\pi^+$	15 ± 3		30 ± 12

there is also abundant production of $Y^*(1385)$, $K^*(891)$ and $N^*(1688)$ — see for instance Fig. 3 which exhibits the $\Lambda\,\pi$ mass-spectrum.

DISCUSSION

Trebykhovskii

My question concerns the mass and width for the K^+K^+ system at 1.3 GeV. Do authors think they have discovered a resonance in this system, and if so, what is its mass and width?

Muller.

The «bump» lies between 1200 and 1350 MeV; it includes 61 events against 42 expected from phase space.

Sakurai.

If there is an $I = 3/2$ $K\pi\pi$ resonance, as seems to be the case experimentally, we expect from unitary symmetry an $S = 2$ $KK\pi$ resonance. For this reason I would like to ask Dr. Muller whether he has examined the $KK\pi$ mass spectrum?

Muller.

We have not yet examined the $KK\pi$ mass spectrum.