Seminar in Honour of Dr. M. Aguilar-Benitez 60th Birthday

AMPLITUDE ANALYSIS FOR HYPERCHARGE EXCHANGE TWO-BODY REACTIONS

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- INTRODUCTION
- THE JEN YEARS
- THE CERN YEARS
- CONCLUSIONS

QUARK MODEL PREDICTIONS

- Magnetic moments

$$\frac{\mu_n}{\mu_p} = -\frac{2}{3} \qquad Exp: -0.68497945 \pm 0.00000058 \tag{1}$$

- Radiative decays of vector mesons

$$BR(\phi \to \pi^0 \gamma) = 0 \tag{2}$$

$$\frac{BR(\omega \to \pi^0 \gamma)}{BR(\rho \to \pi^0 \gamma)} = (\frac{\mu_d - \mu_u}{\mu_d + \mu_u})^2 = 9 \tag{3}$$

- Hadron masses

$$m_\Delta - m_N = \frac{1}{2}[m_\rho - m_\pi] \tag{4}$$

THE REACTION $K^- \; p \to \pi^- \; Y^*(1385)$

In the transversity frame, this reaction is given by two sets of amplitudes:

$$\begin{Bmatrix} T_{3\;-1} \\ T_{-1\;-1} \end{Bmatrix} \qquad \begin{Bmatrix} T_{1\;1} \\ T_{-3\;1} \end{Bmatrix}$$

- Simple quark model plus "additivity" predictions

$$T_{3\;-1} = T_{-3\;1} = 0 \tag{5}$$

- Write the spin-flavour wavefunctions, i.e. :

$$\mid p \uparrow >= \sqrt{\frac{1}{18}}[u \uparrow u \downarrow d \uparrow + u \downarrow u \uparrow d \uparrow -2u \uparrow u \uparrow d \downarrow + permutations] \tag{6}$$

$$\mid Y(-\frac{3}{2}) >= \sqrt{\frac{1}{3}}[u \downarrow u \downarrow s \downarrow + permutations] \tag{7}$$

- Similarly

$$T_{1\;1} = T_{-1\;-1} \tag{8}$$

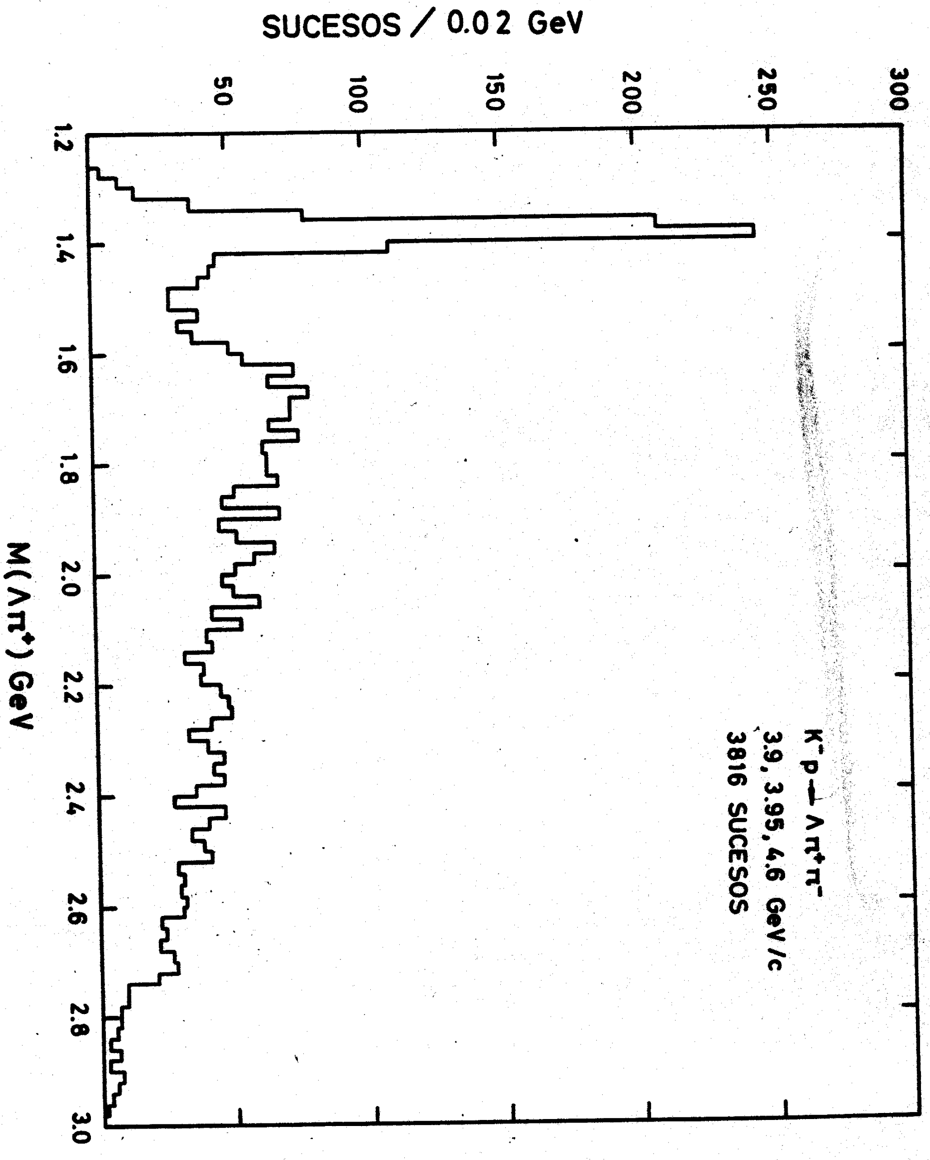
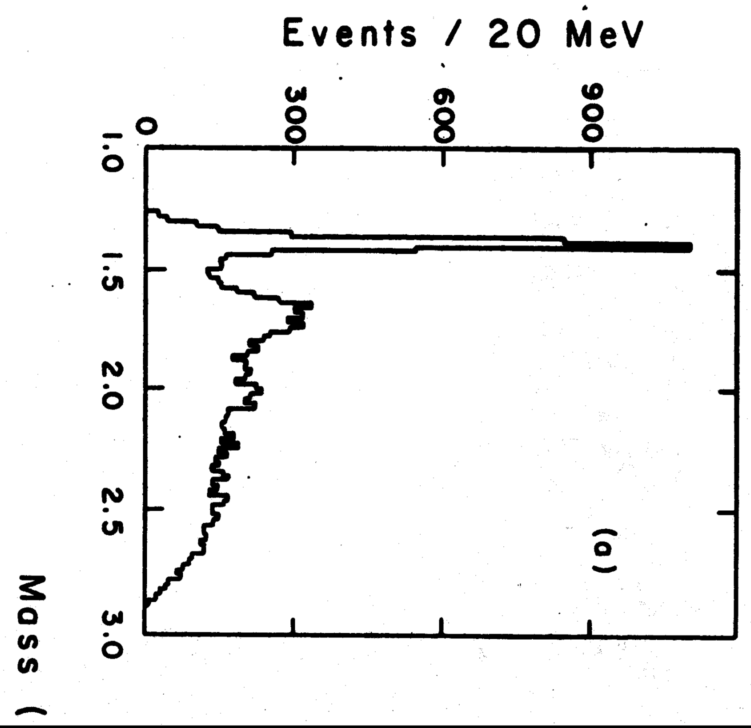

SUCESOS / 0.02 GeV
50
100
150
200
250
300
1.2
1.4
1.6
1.8
2.0
2.2
2.4
2.6
2.8
3.0
$K^-p \rightarrow \Lambda\pi^+\pi^-$
3.9, 3.95, 4.6 GeV/c
3816 SUCESOS
$M(\Lambda\pi^+)$ GeV

Fig. II-1



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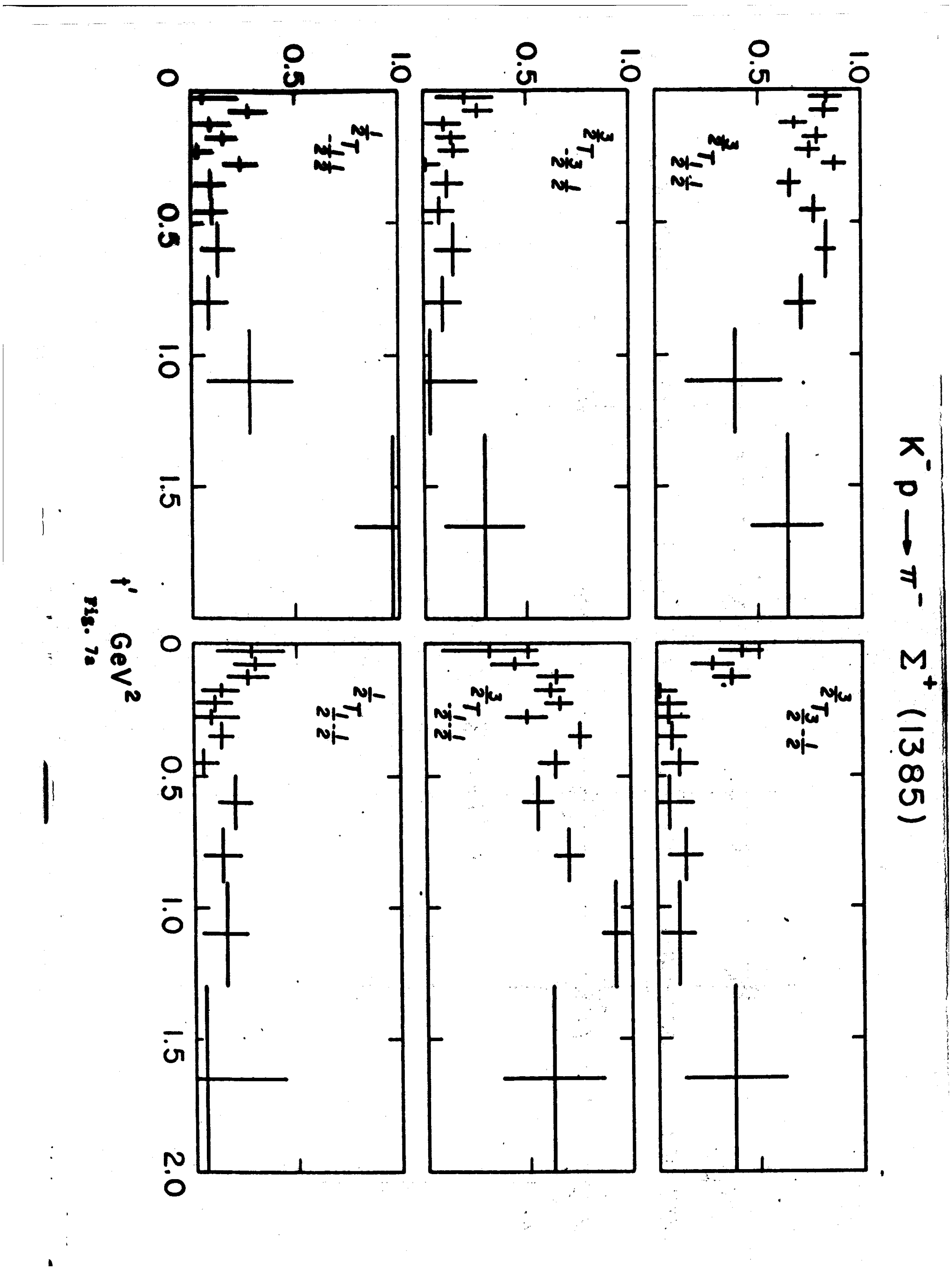

Fig. 7a

CERN -EUROPEAN ORGANIZATION FOR NUCLEAR RESEARCH
Submitted to CERN/D.Ph.II/PHYS 75-23 Rev.
Nuclear Physics B 29 May 1975
fSTUDY OF HYPE~CHARG~ EXC~GE REACTIONS OF
THE TYPE K p -+ 1 3/2- AT 4.2 GeV/c
Amsterdam-CERN-Nijmegen-Oxford Collaboration
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MAG/ef

ANALYSIS OF HYPERCHARCHE EXCHANGE $K^- \; p$ TWO-BODY REACTIONS

- $K^- \; p \to \pi^0 \Lambda$
- $K^- \; p \to \eta \Lambda$
- $K^- \; p \to \eta' \Lambda$
- $K^- \; p \to \phi \Lambda$
- $K^- \; p \to \omega \Lambda$
- $K^- \; p \to \rho \Lambda$
- $K^- \; p \to \phi \Sigma^0$
- $K^- \; p \to \rho \Sigma^0$
- $K^- \; p \to \pi^- \Sigma^{*+}(1385)$
- $K^- \; p \to \rho^- \Sigma^{*+}(1385)$
- $K^- \; p \to \phi \Sigma^{*0}(1385)$
- Plus those related by crossing studied with $\pi^\pm$ beams