# CROSS-SECTIONS FOR THE REACTION $\bar{p}p \to K\bar{K}n\pi$ (n = 3,4) BETWEEN 1.50-2.04 GeV/c

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## Expérimental sample

Film was exposed in the CERN 2-meters HBC in an experiment undertaken by the Glasgow-Liverpool-Lausanne/Neuchâtel-Paris (IPN) collaboration.

The cross-sections presented in this paper concern only the part of the data analyzed at Lausanne and Neuchâtel; this sample represents about a quarter of the total statistics for the collaboration. The beam was set up successively at 8 different incident momenta : 1.50, 1.56, 1.68, 1.75, 1.80, 1.86, 1.93, 2.04 GeV/c.

The film was double-scanned for strange-particle decays ($V^0$ topology). The scanning efficiency was 98.5 % (ref. 6). The events were processed through the standard THRESH-GRIND-SLICE chain of programs.

The number of events for the most abundant 3- or 4-pion channels are :

(a) $K_1^0 K_1^0 \pi^+ \pi^- \pi^0$ 202 events

(b) $K_1^0 K^\pm \pi^\mp \pi^+ \pi^-$ 361 events

(c) $K_1^0 K^\pm \pi^\mp \pi^+ \pi^- \pi^0$ 221 events

The cross-sections for reactions (b) and (c) (fig. b and c) present no structure in this domain of energy. Only reaction (a) (fig. a) has a bump in the U mass region.

## Reaction $K_1^0 K_1^0 \pi^+ \pi^- \pi^0$

The variation of the cross-section for this process as a function of momentum was parametrized in two ways : - a linear function; - a superposition of a linear background and a Breit-Wigner.

We obtain :

- linear background : $\chi^2 = 24/19$
- linear background + Breit-Wigner : $\chi^2 = 16/16$

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The improvement in the goodness of fit seems to be significant.

The parameters of the resonance are found to be :

$M = 2362 \pm 13$ MeV $\qquad \Gamma = 45 \,^{+\,18}_{-\,15}$ MeV

The reaction $K_1^o K_1^o \pi^+ \pi^- \pi^o$ contains 19 ± 2 % of $\omega^o$'s. One can ask if the bump in the reaction (a) comes from an effect in the $K_1^o K_1^o \omega^o$ channel. The percentage of $\omega^o$ production, for the various momenta, is the following :

| $\vec{P}_{inc}$ | $\sqrt{s}$ | % of $\omega^o$ |
|---|---|---|
| 1.56 GeV/c | 2.28 GeV | 21 ± 7 |
| 1.68 | 2.32 | 19 ± 6 |
| 1.75 | 2.34 | 27 ± 5 |
| 1.80 | 2.36 | 15 ± 4 |
| 1.86 | 2.38 | 15 ± 4 |
| 1.93 | 2.41 | 17 ± 4 |
| 2.04 | 2.44 | 20 ± 6 |

These percentages are estimated by taking the number of events in the $\omega^o$ mass region defined by the limits : 0.74 - 0.82 GeV.

The variation of the abundance of the $K_1^o K_1^o \omega^o$ channel does not seem to be sufficient to explain fully the bump in reaction (a) cross-section. Futhermore the number of events in the $K_1^o K_1^o \omega^o$ channel is too low to decide whether there exists a direct resonance in this channel.

References


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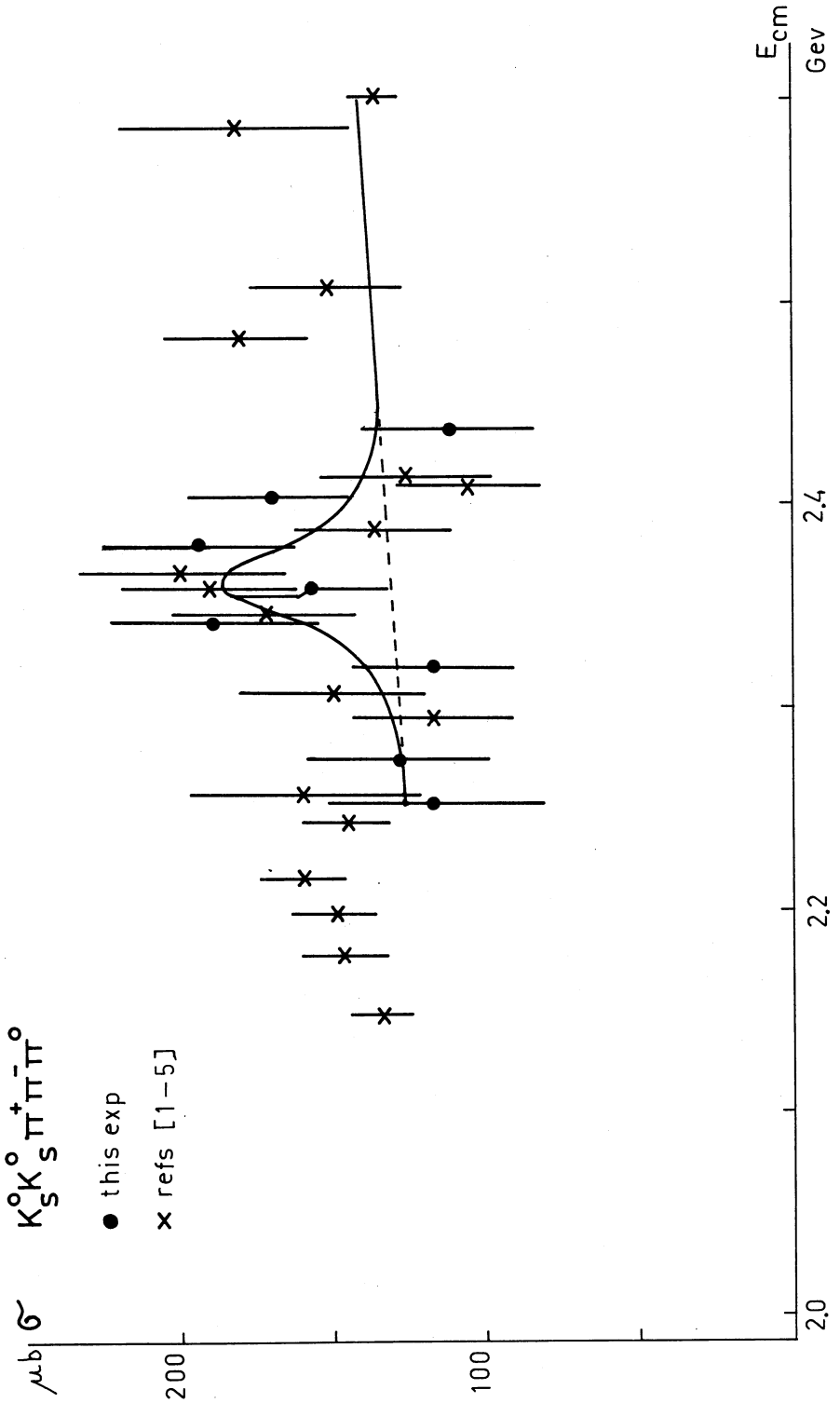


Fig. a) Cross-section for the $K^0_1 K^0_1 \pi^+\pi^-\pi^0$ reaction. The full line represents the fit with a linear background and a Breit-Wigner

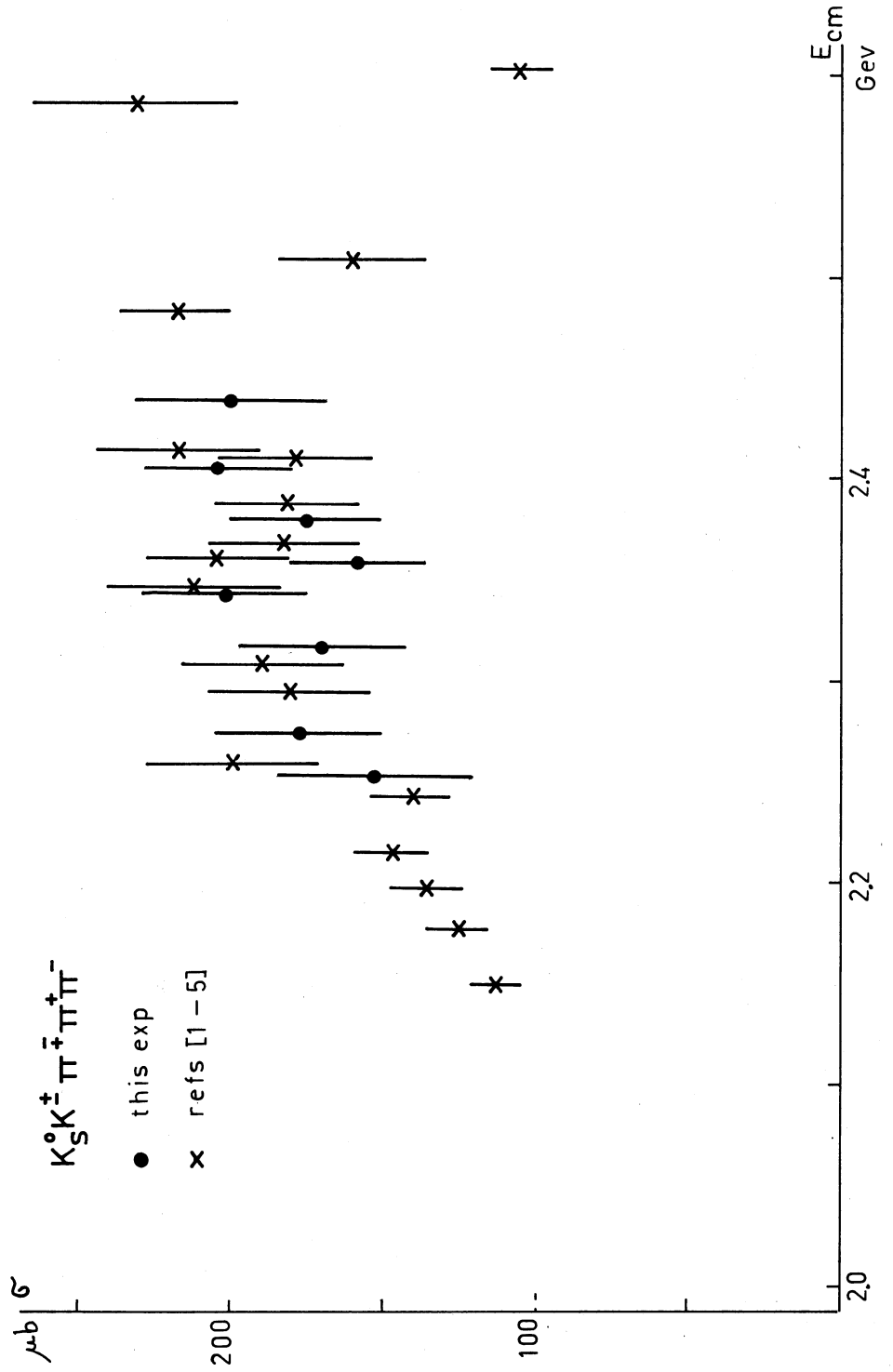


Fig. b) Cross-section for the $K_1^0 K^{\pm} \pi^{\mp} \pi^+ \pi^-$ reaction

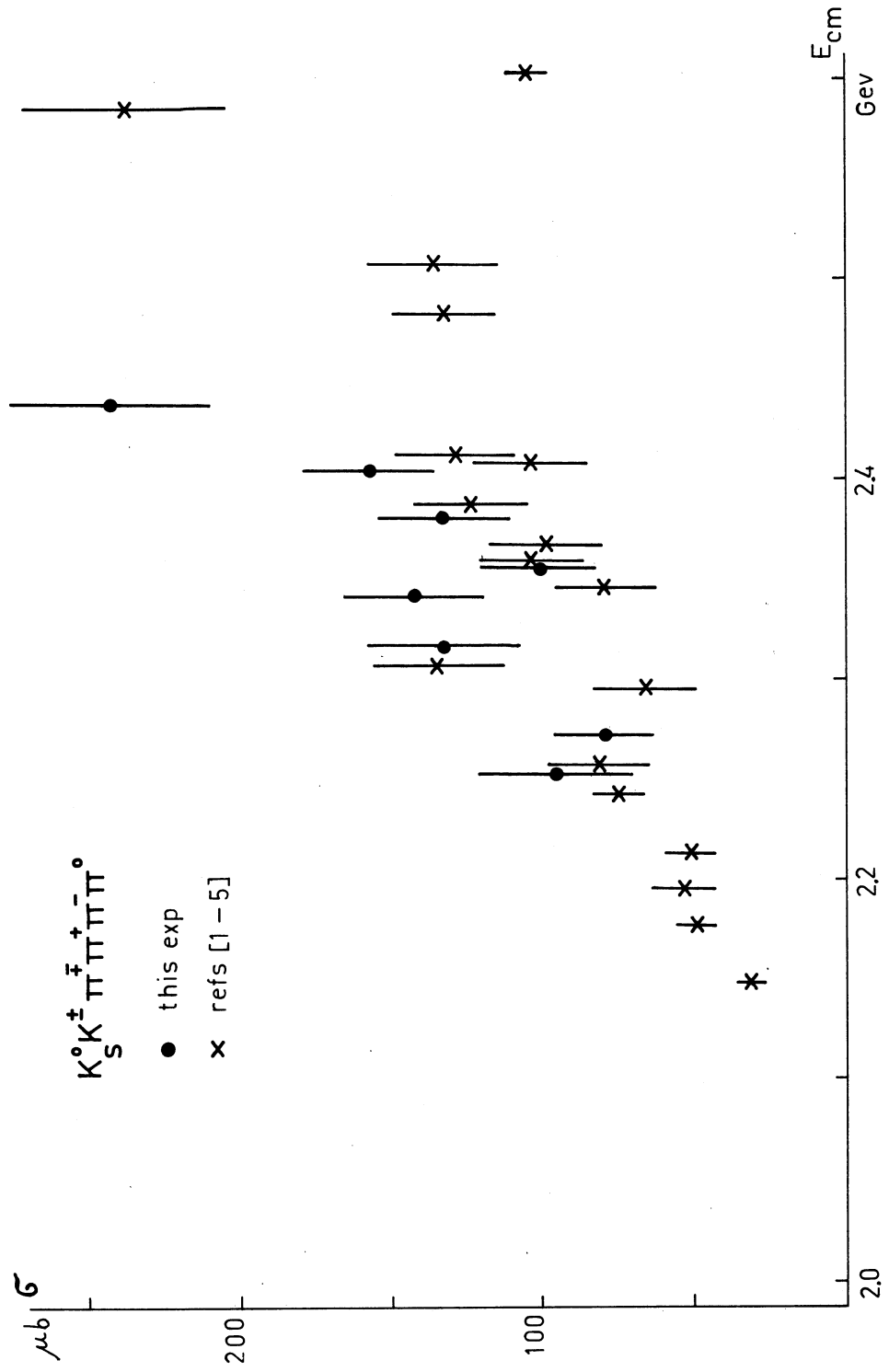


Fig. c) Cross-section for the $K_1^0 K^{\pm} \pi^{\mp} \pi^+ \pi^- \pi^0$ reaction