# $\Sigma(1480)$ Bumps

$I(J^P) = 1(?^?)$ Status: *

OMITTED FROM SUMMARY TABLE

These are peaks seen in $\Lambda\pi$ and $\Sigma\pi$ spectra in the reaction $\pi^+ p \rightarrow (Y\pi)K^+$ at 1.7 GeV/$c$. Also, the $Y$ polarization oscillates in the same region.

MILLER 70 suggests a possible alternate explanation in terms of a reflection of $N(1675) \rightarrow \Lambda K$ decay. However, such an explanation for the $(\Sigma^+\pi^0)K^+$ channel in terms of $\Delta(1650) \rightarrow \Sigma K$ decay seems unlikely (see PAN 70). In addition such reflections would also have to account for the oscillation of the $Y$ polarization in the 1480 MeV region.

HANSON 71, with less data than PAN 70, can neither confirm nor deny the existence of this state. MAST 75 sees no structure in this region in $K^- p \rightarrow \Lambda\pi^0$.

ENGELEN 80 performs a multichannel analysis of $K^- p \rightarrow p\overline{K}^0\pi^-$ at 4.2 GeV/$c$. They observe a 3.5 standard-deviation signal at 1480 MeV in $p\overline{K}^0$ which cannot be explained as a reflection of any competing channel.

## $\Sigma(1480)$ MASS (PRODUCTION EXPERIMENTS)

| *VALUE* (MeV) | *EVTS* | *DOCUMENT ID* | | *TECN* | *CHG* | *COMMENT* |
|---|---|---|---|---|---|---|
| **≈ 1480 OUR ESTIMATE** | | | | | | |
| 1480 | 120 | ENGELEN | 80 | HBC | + | $K^- p \rightarrow (p\overline{K}^0)\pi^-$ |
| 1485 ± 10 | | CLINE | 73 | MPWA | − | $K^- d \rightarrow (\Lambda\pi^-)p$ |
| 1479 ± 10 | | PAN | 70 | HBC | + | $\pi^+ p \rightarrow (\Lambda\pi^+)K^+$ |
| 1465 ± 15 | | PAN | 70 | HBC | + | $\pi^+ p \rightarrow (\Sigma\pi)K^+$ |

## $\Sigma(1480)$ WIDTH (PRODUCTION EXPERIMENTS)

| *VALUE* (MeV) | *EVTS* | *DOCUMENT ID* | | *TECN* | *CHG* | *COMMENT* |
|---|---|---|---|---|---|---|
| 80 ± 20 | 120 | ENGELEN | 80 | HBC | + | $K^- p \rightarrow (p\overline{K}^0)\pi^-$ |
| 40 ± 20 | | CLINE | 73 | MPWA | − | $K^- d \rightarrow (\Lambda\pi^-)p$ |
| 31 ± 15 | | PAN | 70 | HBC | + | $\pi^+ p \rightarrow (\Lambda\pi^+)K^+$ |
| 30 ± 20 | | PAN | 70 | HBC | + | $\pi^+ p \rightarrow (\Sigma\pi)K^+$ |

## $\Sigma(1480)$ DECAY MODES (PRODUCTION EXPERIMENTS)

| | Mode |
|---|---|
| $\Gamma_1$ | $N\overline{K}$ |
| $\Gamma_2$ | $\Lambda\pi$ |
| $\Gamma_3$ | $\Sigma\pi$ |

## $\Sigma(1480)$ BRANCHING RATIOS (PRODUCTION EXPERIMENTS)

### $\Gamma(\Sigma\pi)/\Gamma(\Lambda\pi)$ — $\Gamma_3/\Gamma_2$

| VALUE | DOCUMENT ID | | TECN | CHG |
|---|---|---|---|---|
| 0.82±0.51 | PAN | 70 | HBC | + |

### $\Gamma(N\overline{K})/\Gamma(\Lambda\pi)$ — $\Gamma_1/\Gamma_2$

| VALUE | DOCUMENT ID | | TECN | CHG |
|---|---|---|---|---|
| 0.72±0.50 | PAN | 70 | HBC | + |

### $\Gamma(N\overline{K})/\Gamma_{total}$ — $\Gamma_1/\Gamma$

| VALUE | DOCUMENT ID | | TECN | COMMENT |
|---|---|---|---|---|
| small | CLINE | 73 | MPWA | $K^- d \to (\Lambda\pi^-)p$ |

## $\Sigma(1480)$ REFERENCES (PRODUCTION EXPERIMENTS)


| | | | | |
|---|---|---|---|---|
| ENGELEN | 80 | NP B167 61 | J.J. Engelen *et al.* | (NIJM, AMST, CERN+) |
| MAST | 75 | PR D11 3078 | T.S. Mast *et al.* | (LBL) |
| CLINE | 73 | LNC 6 205 | D. Cline, R. Laumann, J. Mapp | (WISC) IJP |
| HANSON | 71 | PR D4 1296 | P. Hanson, G.E. Kalmus, J. Louie | (LBL) I |
| MILLER | 70 | Duke Conf. 229 | D.H. Miller | (PURD) |
| Hyperon Resonances, 1970 | | | | |
| PAN | 70 | PR D2 49 | Y.L. Pan *et al.* | (PENN) |
| Also | 69 | PRL 23 808 | Y.L. Pan, F.L. Forman | (PENN) I |
| Also | 69B | PRL 23 806 | Y.L. Pan, F.L. Forman | (PENN) I |