

$\Sigma(1560)$ Bumps

$$I(J^P) = 1(?^?) \quad \text{Status: } **$$

OMITTED FROM SUMMARY TABLE

This entry lists peaks reported in mass spectra around 1560 MeV without implying that they are necessarily related.

DIONISI 78B observes a 6 standard-deviation enhancement at 1553 MeV in the charged $\Lambda/\Sigma\pi$ mass spectra from $K^- p \rightarrow (\Lambda/\Sigma)\pi K\bar{K}$ at 4.2 GeV/c. In a CERN ISR experiment, LOCKMAN 78 reports a narrow 6 standard-deviation enhancement at 1572 MeV in $\Lambda\pi^\pm$ from the reaction $pp \rightarrow \Lambda\pi^+\pi^- X$. These enhancements are unlikely to be associated with the $\Sigma(1580)$ (which has not been confirmed by several recent experiments – see the next entry in the Listings).

CARROLL 76 observes a bump at 1550 MeV (as well as one at 1580 MeV) in the isospin-1 $\bar{K}N$ total cross section, but uncertainties in cross section measurements outside the mass range of the experiment preclude estimating its significance.

See also MEADOWS 80 for a review of this state.

 **$\Sigma(1560)$ MASS
(PRODUCTION EXPERIMENTS)**

| <u>VALUE (MeV)</u> | <u>EVTS</u> | <u>DOCUMENT ID</u> | <u>TECN</u> | <u>CHG</u> | <u>COMMENT</u> |
|-----------------------------|-------------|--------------------|-------------|------------|--------------------------------------------|
| ≈ 1560 OUR ESTIMATE | | | | | |
| 1553 ± 7 | 121 | DIONISI | 78B | HBC | \pm $K^- p \rightarrow (Y\pi)K\bar{K}$ |
| 1572 ± 4 | 40 | LOCKMAN | 78 | SPEC | \pm $pp \rightarrow \Lambda\pi^+\pi^- X$ |

 **$\Sigma(1560)$ WIDTH
(PRODUCTION EXPERIMENTS)**

| <u>VALUE (MeV)</u> | <u>EVTS</u> | <u>DOCUMENT ID</u> | <u>TECN</u> | <u>CHG</u> | <u>COMMENT</u> |
|--------------------|-------------|----------------------|-------------|------------|--------------------------------------------|
| 79 ± 30 | 121 | DIONISI | 78B | HBC | \pm $K^- p \rightarrow (Y\pi)K\bar{K}$ |
| 15 ± 6 | 40 | ¹ LOCKMAN | 78 | SPEC | \pm $pp \rightarrow \Lambda\pi^+\pi^- X$ |

 **$\Sigma(1560)$ DECAY MODES
(PRODUCTION EXPERIMENTS)**

| Mode | Fraction (Γ_j/Γ) |
|-----------------------------|--------------------------------|
| $\Gamma_1 \quad \Lambda\pi$ | seen |
| $\Gamma_2 \quad \Sigma\pi$ | |

$\Sigma(1560)$ BRANCHING RATIOS (PRODUCTION EXPERIMENTS)

| $\Gamma(\Sigma\pi)/[\Gamma(\Lambda\pi) + \Gamma(\Sigma\pi)]$ | $\Gamma_2/(\Gamma_1+\Gamma_2)$ | | | | |
|--------------------------------------------------------------|--------------------------------|-------------|------------|----------------|--------------------------------------|
| <u>VALUE</u> | <u>DOCUMENT ID</u> | <u>TECN</u> | <u>CHG</u> | <u>COMMENT</u> | |
| 0.35 ± 0.12 | DIONISI | 78B | HBC | ± | $K^- p \rightarrow (Y\pi) K \bar{K}$ |

| $\Gamma(\Lambda\pi)/\Gamma_{\text{total}}$ | Γ_1/Γ | | | | |
|--------------------------------------------|--------------------|-------------|------------|----------------|--------------------------------------|
| <u>VALUE</u> | <u>DOCUMENT ID</u> | <u>TECN</u> | <u>CHG</u> | <u>COMMENT</u> | |
| seen | LOCKMAN | 78 | SPEC | ± | $pp \rightarrow \Lambda\pi^+\pi^- X$ |

$\Sigma(1560)$ FOOTNOTES (PRODUCTION EXPERIMENTS)

¹ The width observed by LOCKMAN 78 is consistent with experimental resolution.

$\Sigma(1560)$ REFERENCES (PRODUCTION EXPERIMENTS)

| | | | | |
|---------|-----|--------------------|------------------------------------|-----------------|
| MEADOWS | 80 | Toronto Conf. 283 | B.T. Meadows | |
| DIONISI | 78B | PL 78B 154 | C. Dionisi, R. Armenteros, J. Diaz | (CERN, AMST+) I |
| LOCKMAN | 78 | Saclay DPHPE 78-01 | W. Lockman <i>et al.</i> | (UCLA, SACL) |
| CARROLL | 76 | PRL 37 806 | A.S. Carroll <i>et al.</i> | (BNL) I |