# $\Sigma(1770)\ P_{11}$

$I(J^P) = 1(\frac{1}{2}^+)$ Status: *

OMITTED FROM SUMMARY TABLE

Evidence for this state now rests solely on solution 1 of BAILLON 75, (see the footnotes) but the $\Lambda\pi$ partial-wave amplitudes of this solution are in disagreement with amplitudes from most other $\Lambda\pi$ analyses.

## $\Sigma(1770)$ MASS

| *VALUE* (MeV) | *DOCUMENT ID* | | *TECN* | *COMMENT* |
|---|---|---|---|---|
| **≈ 1770 OUR ESTIMATE** | | | | |
| 1738 ± 10 | [1] GOPAL | 77 | DPWA | $\overline{K}N$ multichannel |
| 1770 ± 20 | [2] BAILLON | 75 | IPWA | $\overline{K}N \to \Lambda\pi$ |
| 1772 | [3] KANE | 72 | DPWA | $K^- p \to \Sigma\pi$ |

## $\Sigma(1770)$ WIDTH

| *VALUE* (MeV) | *DOCUMENT ID* | | *TECN* | *COMMENT* |
|---|---|---|---|---|
| 72 ± 10 | [1] GOPAL | 77 | DPWA | $\overline{K}N$ multichannel |
| 80 ± 30 | [2] BAILLON | 75 | IPWA | $\overline{K}N \to \Lambda\pi$ |
| 80 | [3] KANE | 72 | DPWA | $K^- p \to \Sigma\pi$ |

## $\Sigma(1770)$ DECAY MODES

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

## $\Sigma(1770)$ BRANCHING RATIOS

See "Sign conventions for resonance couplings" in the Note on $\Lambda$ and $\Sigma$ Resonances.

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

| *VALUE* | *DOCUMENT ID* | | *TECN* | *COMMENT* |
|---|---|---|---|---|
| 0.14 ± 0.04 | [1] GOPAL | 77 | DPWA | $\overline{K}N$ multichannel |

### $(\Gamma_i\Gamma_f)^{1/2}/\Gamma_{total}$ in $N\overline{K} \to \Sigma(1770) \to \Lambda\pi$ $(\Gamma_1\Gamma_2)^{1/2}/\Gamma$

| *VALUE* | *DOCUMENT ID* | | *TECN* | *COMMENT* |
|---|---|---|---|---|
| < 0.04 | GOPAL | 77 | DPWA | $\overline{K}N$ multichannel |
| −0.08 ± 0.02 | [2] BAILLON | 75 | IPWA | $\overline{K}N \to \Lambda\pi$ |

## $(\Gamma_i\Gamma_f)^{1/2}/\Gamma_{total}$ in $N\overline{K} \to \Sigma(1770) \to \Sigma\pi$ $(\Gamma_1\Gamma_3)^{1/2}/\Gamma$

| VALUE | DOCUMENT ID | | TECN | COMMENT |
|---|---|---|---|---|
| $< 0.04$ | GOPAL | 77 | DPWA | $\overline{K}N$ multichannel |
| $-0.108$ | [3] KANE | 72 | DPWA | $K^- p \to \Sigma\pi$ |

## $\Sigma(1770)$ FOOTNOTES

[1] Required to fit the isospin-1 total cross section of CARROLL 76 in the $\overline{K}N$ channel. The addition of new $K^- p$ polarization and $K^- n$ differential cross-section data in GOPAL 80 find it to be more consistent with the $\Sigma(1660)$ $P_{11}$.

[2] From solution 1 of BAILLON 75; not present in solution 2.

[3] Not required in KANE 74, which supersedes KANE 72.

## $\Sigma(1770)$ REFERENCES


| | | | | |
|---|---|---|---|---|
| GOPAL | 80 | Toronto Conf. 159 | G.P. Gopal | (RHEL) |
| GOPAL | 77 | NP B119 362 | G.P. Gopal *et al.* | (LOIC, RHEL) IJP |
| CARROLL | 76 | PRL 37 806 | A.S. Carroll *et al.* | (BNL) I |
| BAILLON | 75 | NP B94 39 | P.H. Baillon, P.J. Litchfield | (CERN, RHEL) IJP |
| KANE | 74 | LBL-2452 | D.F. Kane | (LBL) IJP |
| KANE | 72 | PR D5 1583 | D.F.J. Kane | (LBL) |