# $\Sigma(2000)\ S_{11}$

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

OMITTED FROM SUMMARY TABLE

We list here all reported $S_{11}$ states lying above the $\Sigma(1750)\ S_{11}$.

## $\Sigma(2000)$ MASS

| *VALUE* (MeV) | *DOCUMENT ID* | | *TECN* | *COMMENT* |
|---|---|---|---|---|
| **≈ 2000 OUR ESTIMATE** | | | | |
| 1944 ± 15 | GOPAL | 80 | DPWA | $\overline{K}N \rightarrow \overline{K}N$ |
| 1955 ± 15 | GOPAL | 77 | DPWA | $\overline{K}N$ multichannel |
| 1755 or 1834 | [1] MARTIN | 77 | DPWA | $\overline{K}N$ multichannel |
| 2004 ± 40 | VANHORN | 75 | DPWA | $K^-p \rightarrow \Lambda\pi^0$ |

## $\Sigma(2000)$ WIDTH

| *VALUE* (MeV) | *DOCUMENT ID* | | *TECN* | *COMMENT* |
|---|---|---|---|---|
| 215 ± 25 | GOPAL | 80 | DPWA | $\overline{K}N \rightarrow \overline{K}N$ |
| 170 ± 40 | GOPAL | 77 | DPWA | $\overline{K}N$ multichannel |
| 413 or 450 | [1] MARTIN | 77 | DPWA | $\overline{K}N$ multichannel |
| 116 ± 40 | VANHORN | 75 | DPWA | $K^-p \rightarrow \Lambda\pi^0$ |

## $\Sigma(2000)$ DECAY MODES

| | Mode |
|---|---|
| $\Gamma_1$ | $N\overline{K}$ |
| $\Gamma_2$ | $\Lambda\pi$ |
| $\Gamma_3$ | $\Sigma\pi$ |
| $\Gamma_4$ | $\Lambda(1520)\pi$ |
| $\Gamma_5$ | $N\overline{K}^*(892)$, $S$=1/2, $S$-wave |
| $\Gamma_6$ | $N\overline{K}^*(892)$, $S$=3/2, $D$-wave |

## $\Sigma(2000)$ 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* |
|---|---|---|---|---|
| 0.51 ± 0.05 | GOPAL | 80 | DPWA | $\overline{K}N \rightarrow \overline{K}N$ |
| 0.44 ± 0.05 | GOPAL | 77 | DPWA | See GOPAL 80 |
| 0.62 or 0.57 | [1] MARTIN | 77 | DPWA | $\overline{K}N$ multichannel |

### $(\Gamma_i\Gamma_f)^{1/2}/\Gamma_{total}$ in $N\overline{K} \to \Sigma(2000) \to \Lambda\pi$ $(\Gamma_1\Gamma_2)^{1/2}/\Gamma$

| VALUE | DOCUMENT ID | | TECN | COMMENT |
|---|---|---|---|---|
| $0.08 \pm 0.03$ | GOPAL | 77 | DPWA | $\overline{K}N$ multichannel |
| $-0.19$ or $-0.18$ | [1] MARTIN | 77 | DPWA | $\overline{K}N$ multichannel |
| not seen | BAILLON | 75 | IPWA | $\overline{K}N \to \Lambda\pi$ |
| $+0.07^{+0.02}_{-0.01}$ | VANHORN | 75 | DPWA | $K^- p \to \Lambda\pi^0$ |

### $(\Gamma_i\Gamma_f)^{1/2}/\Gamma_{total}$ in $N\overline{K} \to \Sigma(2000) \to \Sigma\pi$ $(\Gamma_1\Gamma_3)^{1/2}/\Gamma$

| VALUE | DOCUMENT ID | | TECN | COMMENT |
|---|---|---|---|---|
| $+0.20 \pm 0.04$ | GOPAL | 77 | DPWA | $\overline{K}N$ multichannel |
| $+0.26$ or $+0.24$ | [1] MARTIN | 77 | DPWA | $\overline{K}N$ multichannel |

### $(\Gamma_i\Gamma_f)^{1/2}/\Gamma_{total}$ in $N\overline{K} \to \Sigma(2000) \to \Lambda(1520)\pi$ $(\Gamma_1\Gamma_4)^{1/2}/\Gamma$

| VALUE | DOCUMENT ID | | TECN | COMMENT |
|---|---|---|---|---|
| $+0.081 \pm 0.021$ | [2] CAMERON | 77 | DPWA | $P$-wave decay |

### $(\Gamma_i\Gamma_f)^{1/2}/\Gamma_{total}$ in $N\overline{K} \to \Sigma(2000) \to N\overline{K}^*(892)$, $S$=1/2, $S$-wave $(\Gamma_1\Gamma_5)^{1/2}/\Gamma$

| VALUE | DOCUMENT ID | | TECN | COMMENT |
|---|---|---|---|---|
| $+0.10 \pm 0.02$ | [2] CAMERON | 78B | DPWA | $K^- p \to N\overline{K}^*$ |

### $(\Gamma_i\Gamma_f)^{1/2}/\Gamma_{total}$ in $N\overline{K} \to \Sigma(2000) \to N\overline{K}^*(892)$, $S$=3/2, $D$-wave $(\Gamma_1\Gamma_6)^{1/2}/\Gamma$

| VALUE | DOCUMENT ID | | TECN | COMMENT |
|---|---|---|---|---|
| $-0.07 \pm 0.03$ | CAMERON | 78B | DPWA | $K^- p \to N\overline{K}^*$ |

## $\Sigma(2000)$ FOOTNOTES

[1] The two MARTIN 77 values are from a T-matrix pole and from a Breit-Wigner fit.
[2] The published sign has been changed to be in accord with the baryon-first convention.

## $\Sigma(2000)$ REFERENCES


| | | | | |
|---|---|---|---|---|
| GOPAL | 80 | Toronto Conf. 159 | G.P. Gopal | (RHEL) IJP |
| CAMERON | 78B | NP B146 327 | W. Cameron *et al.* | (RHEL, LOIC) IJP |
| CAMERON | 77 | NP B131 399 | W. Cameron *et al.* | (RHEL, LOIC) IJP |
| GOPAL | 77 | NP B119 362 | G.P. Gopal *et al.* | (LOIC, RHEL) IJP |
| MARTIN | 77 | NP B127 349 | B.R. Martin, M.K. Pidcock, R.G. Moorhouse | (LOUC+) IJP |
| Also | 77B | NP B126 266 | B.R. Martin, M.K. Pidcock | (LOUC) |
| Also | 77C | NP B126 285 | B.R. Martin, M.K. Pidcock | (LOUC) IJP |
| BAILLON | 75 | NP B94 39 | P.H. Baillon, P.J. Litchfield | (CERN, RHEL) IJP |
| VANHORN | 75 | NP B87 145 | A.J. van Horn | (LBL) IJP |
| Also | 75B | NP B87 157 | A.J. van Horn | (LBL) IJP |