

$\Sigma(2000) S_{11}$

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

OMITTED FROM SUMMARY TABLE

We list here all reported S_{11} states lying above the $\Sigma(1750) S_{11}$. **$\Sigma(2000)$ MASS**

| <u>VALUE (MeV)</u> | <u>DOCUMENT ID</u> | <u>TECN</u> | <u>COMMENT</u> |
|---|---------------------|-------------|---------------------------------------|
| ≈ 2000 OUR ESTIMATE | | | |
| 1944 \pm 15 | GOPAL | 80 | DPWA $\bar{K}N \rightarrow \bar{K}N$ |
| 1955 \pm 15 | GOPAL | 77 | DPWA $\bar{K}N$ multichannel |
| 1755 or 1834 | ¹ MARTIN | 77 | DPWA $\bar{K}N$ multichannel |
| 2004 \pm 40 | VANHORN | 75 | DPWA $K^- p \rightarrow \Lambda\pi^0$ |

 $\Sigma(2000)$ WIDTH

| <u>VALUE (MeV)</u> | <u>DOCUMENT ID</u> | <u>TECN</u> | <u>COMMENT</u> |
|--------------------|---------------------|-------------|---------------------------------------|
| 215 \pm 25 | GOPAL | 80 | DPWA $\bar{K}N \rightarrow \bar{K}N$ |
| 170 \pm 40 | GOPAL | 77 | DPWA $\bar{K}N$ multichannel |
| 413 or 450 | ¹ MARTIN | 77 | DPWA $\bar{K}N$ multichannel |
| 116 \pm 40 | VANHORN | 75 | DPWA $K^- p \rightarrow \Lambda\pi^0$ |

 $\Sigma(2000)$ DECAY MODES

| Mode | |
|------------|---|
| Γ_1 | $N\bar{K}$ |
| Γ_2 | $\Lambda\pi$ |
| Γ_3 | $\Sigma\pi$ |
| Γ_4 | $\Lambda(1520)\pi$ |
| Γ_5 | $N\bar{K}^*(892)$, $S=1/2$, S -wave |
| Γ_6 | $N\bar{K}^*(892)$, $S=3/2$, D -wave |

 $\Sigma(2000)$ BRANCHING RATIOSSee "Sign conventions for resonance couplings" in the Note on Λ and Σ Resonances.

| $\Gamma(N\bar{K})/\Gamma_{\text{total}}$ | | | | Γ_1/Γ |
|--|---------------------|-------------|--------------------------------------|-------------------|
| <u>VALUE</u> | <u>DOCUMENT ID</u> | <u>TECN</u> | <u>COMMENT</u> | |
| 0.51 \pm 0.05 | GOPAL | 80 | DPWA $\bar{K}N \rightarrow \bar{K}N$ | |
| 0.44 \pm 0.05 | GOPAL | 77 | DPWA See GOPAL 80 | |
| 0.62 or 0.57 | ¹ MARTIN | 77 | DPWA $\bar{K}N$ multichannel | |

| $(\Gamma_i \Gamma_f)^{1/2} / \Gamma_{\text{total}}$ in $N\bar{K} \rightarrow \Sigma(2000) \rightarrow \Lambda\pi$ | $(\Gamma_1 \Gamma_2)^{1/2} / \Gamma$ | | |
|---|--------------------------------------|------|--|
| VALUE | DOCUMENT ID | TECN | COMMENT |
| 0.08 ± 0.03 | GOPAL | 77 | DPWA $\bar{K}N$ multichannel |
| -0.19 or -0.18 | ¹ MARTIN | 77 | DPWA $\bar{K}N$ multichannel |
| not seen | BAILLON | 75 | IPWA $\bar{K}N \rightarrow \Lambda\pi$ |
| $+0.07^{+0.02}_{-0.01}$ | VANHORN | 75 | DPWA $K^- p \rightarrow \Lambda\pi^0$ |

| $(\Gamma_i \Gamma_f)^{1/2} / \Gamma_{\text{total}}$ in $N\bar{K} \rightarrow \Sigma(2000) \rightarrow \Sigma\pi$ | $(\Gamma_1 \Gamma_3)^{1/2} / \Gamma$ | | |
|--|--------------------------------------|------|------------------------------|
| VALUE | DOCUMENT ID | TECN | COMMENT |
| $+0.20 \pm 0.04$ | GOPAL | 77 | DPWA $\bar{K}N$ multichannel |
| $+0.26$ or $+0.24$ | ¹ MARTIN | 77 | DPWA $\bar{K}N$ multichannel |

| $(\Gamma_i \Gamma_f)^{1/2} / \Gamma_{\text{total}}$ in $N\bar{K} \rightarrow \Sigma(2000) \rightarrow \Lambda(1520)\pi$ | $(\Gamma_1 \Gamma_4)^{1/2} / \Gamma$ | | |
|---|--------------------------------------|------|----------------------|
| VALUE | DOCUMENT ID | TECN | COMMENT |
| $+0.081 \pm 0.021$ | ² CAMERON | 77 | DPWA P -wave decay |

| $(\Gamma_i \Gamma_f)^{1/2} / \Gamma_{\text{total}}$ in $N\bar{K} \rightarrow \Sigma(2000) \rightarrow N\bar{K}^*(892), S=1/2, S\text{-wave}$ | $(\Gamma_1 \Gamma_5)^{1/2} / \Gamma$ | | |
|--|--------------------------------------|------|-------------------------------------|
| VALUE | DOCUMENT ID | TECN | COMMENT |
| $+0.10 \pm 0.02$ | ² CAMERON | 78B | DPWA $K^- p \rightarrow N\bar{K}^*$ |

| $(\Gamma_i \Gamma_f)^{1/2} / \Gamma_{\text{total}}$ in $N\bar{K} \rightarrow \Sigma(2000) \rightarrow N\bar{K}^*(892), S=3/2, D\text{-wave}$ | $(\Gamma_1 \Gamma_6)^{1/2} / \Gamma$ | | |
|--|--------------------------------------|------|-------------------------------------|
| VALUE | DOCUMENT ID | TECN | COMMENT |
| -0.07 ± 0.03 | CAMERON | 78B | DPWA $K^- p \rightarrow N\bar{K}^*$ |

$\Sigma(2000)$ 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 | (RHEL) IJP |
| CAMERON | 78B | NP B146 | 327 | +Franeek, Gopal, Kalmus, McPherson+ |
| CAMERON | 77 | NP B131 | 399 | (RHEL, LOIC) IJP |
| GOPAL | 77 | NP B119 | 362 | +Franeek, Gopal, Kalmus, McPherson+ |
| MARTIN | 77 | NP B127 | 349 | +Ross, VanHorn, McPherson+ |
| Also | 77B | NP B126 | 266 | +Pidcock, Moorhouse |
| Also | 77C | NP B126 | 285 | Martin, Pidcock |
| BAILLON | 75 | NP B94 | 39 | (LOUC, RHEL) IJP |
| VANHORN | 75 | NP B87 | 145 | (LOUC) |
| Also | 75B | NP B87 | 157 | (LOUC) IJP |
| | | | | (CERN, RHEL) IJP |
| | | | | (LBL) IJP |
| | | | | (LBL) IJP |