# $\Lambda(2000)$

$I(J^P) = 0(?^?)$ Status: *

OMITTED FROM SUMMARY TABLE

We list here all the ambiguous resonance possibilities with a mass around 2 GeV. The proposed quantum numbers are $D_3$ (BARBARO-GALTIERI 70 in $\Sigma\pi$), $D_3+F_5$, $P_3+D_5$, or $P_1+D_3$ (BRANDSTETTER 72 in $\Lambda\omega$), and $S_1$ (CAMERON 78B in $N\overline{K}^*$). The first two of the above analyses should now be considered obsolete. See also NAKKASYAN 75.

## $\Lambda(2000)$ MASS

| *VALUE* (MeV) | *DOCUMENT ID* | | *TECN* | *COMMENT* |
|---|---|---|---|---|
| **≈ 2000 OUR ESTIMATE** | | | | |
| 2030±30 | CAMERON | 78B | DPWA | $K^- p \rightarrow N\overline{K}^*$ |
| 1935 to 1971 | [1] BRANDSTET... | 72 | DPWA | $K^- p \rightarrow \Lambda\omega$ |
| 1951 to 2034 | [1] BRANDSTET... | 72 | DPWA | $K^- p \rightarrow \Lambda\omega$ |
| 2010±30 | BARBARO-... | 70 | DPWA | $K^- p \rightarrow \Sigma\pi$ |

## $\Lambda(2000)$ WIDTH

| *VALUE* (MeV) | *DOCUMENT ID* | | *TECN* | *COMMENT* |
|---|---|---|---|---|
| 125±25 | CAMERON | 78B | DPWA | $K^- p \rightarrow N\overline{K}^*$ |
| 180 to 240 | [1] BRANDSTET... | 72 | DPWA | (lower mass) |
| 73 to 154 | [1] BRANDSTET... | 72 | DPWA | (higher mass) |
| 130±50 | BARBARO-... | 70 | DPWA | $K^- p \rightarrow \Sigma\pi$ |

## $\Lambda(2000)$ DECAY MODES

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

## $\Lambda(2000)$ BRANCHING RATIOS

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

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

| *VALUE* | *DOCUMENT ID* | | *TECN* | *COMMENT* |
|---|---|---|---|---|
| −0.20±0.04 | BARBARO-... | 70 | DPWA | $K^- p \rightarrow \Sigma\pi$ |

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

| VALUE | DOCUMENT ID | TECN | COMMENT |
|---|---|---|---|
| 0.17 to 0.25 | [1] BRANDSTET...72 | DPWA | (lower mass) |
| 0.04 to 0.15 | [1] BRANDSTET...72 | DPWA | (higher mass) |

### $(\Gamma_i\Gamma_f)^{1/2}/\Gamma_{total}$ in $N\overline{K} \to \Lambda(2000) \to N\overline{K}^*(892)$, $S$=1/2, $S$-wave $(\Gamma_1\Gamma_4)^{1/2}/\Gamma$

| VALUE | DOCUMENT ID | TECN | COMMENT |
|---|---|---|---|
| $-0.12\pm0.03$ | [2] CAMERON 78B | DPWA | $K^- p \to N\overline{K}^*$ |

### $(\Gamma_i\Gamma_f)^{1/2}/\Gamma_{total}$ in $N\overline{K} \to \Lambda(2000) \to N\overline{K}^*(892)$, $S$=3/2, $D$-wave $(\Gamma_1\Gamma_5)^{1/2}/\Gamma$

| VALUE | DOCUMENT ID | TECN | COMMENT |
|---|---|---|---|
| $+0.09\pm0.03$ | CAMERON 78B | DPWA | $K^- p \to N\overline{K}^*$ |

## $\Lambda(2000)$ FOOTNOTES

[1] The parameters quoted here are ranges from the three best fits; the lower state probably has $J \leq 3/2$, and the higher one probably has $J \leq 5/2$.

[2] The published sign has been changed to be in accord with the baryon-first convention.

## $\Lambda(2000)$ REFERENCES


| | | | | |
|---|---|---|---|---|
| CAMERON | 78B | NP B146 327 | W. Cameron *et al.* | (RHEL, LOIC) IJP |
| NAKKASYAN | 75 | NP B93 85 | A. Nakkasyan | (CERN) IJP |
| BRANDSTET... | 72 | NP B39 13 | A.A. Brandstetter *et al.* | (RHEL, CDEF+) |
| BARBARO-... | 70 | Duke Conf. 173 Hyperon Resonances, 1970 | A. Barbaro-Galtieri | (LRL) IJP |