

# $\Lambda(2000)$

$$I(J^P) = 0(?^?) \quad \text{Status: } *$$

## 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  $N\bar{K}^*$ ). 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
<b><math>\approx 2000</math> OUR ESTIMATE</b>			
$2030 \pm 30$	CAMERON 78B	DPWA	$K^- p \rightarrow N\bar{K}^*$
1935 to 1971	<sup>1</sup> BRANDSTET...72	DPWA	$K^- p \rightarrow \Lambda\omega$
1951 to 2034	<sup>1</sup> BRANDSTET...72	DPWA	$K^- p \rightarrow \Lambda\omega$
$2010 \pm 30$	BARBARO-... 70	DPWA	$K^- p \rightarrow \Sigma\pi$

### $\Lambda(2000)$ WIDTH

VALUE (MeV)	DOCUMENT ID	TECN	COMMENT
$125 \pm 25$	CAMERON 78B	DPWA	$K^- p \rightarrow N\bar{K}^*$
180 to 240	<sup>1</sup> BRANDSTET...72	DPWA	(lower mass)
73 to 154	<sup>1</sup> BRANDSTET...72	DPWA	(higher mass)
$130 \pm 50$	BARBARO-... 70	DPWA	$K^- p \rightarrow \Sigma\pi$

### $\Lambda(2000)$ DECAY MODES

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

### $\Lambda(2000)$ BRANCHING RATIOS

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

$(\Gamma_i \Gamma_f)^{1/2} / \Gamma_{\text{total}}$ in $N\bar{K} \rightarrow \Lambda(2000) \rightarrow \Sigma\pi$	DOCUMENT ID	TECN	COMMENT	$(\Gamma_1 \Gamma_2)^{1/2} / \Gamma$
$-0.20 \pm 0.04$	BARBARO-... 70	DPWA	$K^- p \rightarrow \Sigma\pi$	

$(\Gamma_i \Gamma_f)^{1/2} / \Gamma_{\text{total}}$ in $N\bar{K} \rightarrow \Lambda(2000) \rightarrow \Lambda\omega$	$(\Gamma_1 \Gamma_3)^{1/2} / \Gamma$
VALUE	DOCUMENT ID TECN COMMENT
0.17 to 0.25	<sup>1</sup> BRANDSTET...72 DPWA (lower mass)
0.04 to 0.15	<sup>1</sup> BRANDSTET...72 DPWA (higher mass)

$(\Gamma_i \Gamma_f)^{1/2} / \Gamma_{\text{total}}$ in $N\bar{K} \rightarrow \Lambda(2000) \rightarrow N\bar{K}^*(892), S=1/2, S\text{-wave}$	$(\Gamma_1 \Gamma_4)^{1/2} / \Gamma$
VALUE	DOCUMENT ID TECN COMMENT
$-0.12 \pm 0.03$	<sup>2</sup> CAMERON 78B DPWA $K^- p \rightarrow N\bar{K}^*$

$(\Gamma_i \Gamma_f)^{1/2} / \Gamma_{\text{total}}$ in $N\bar{K} \rightarrow \Lambda(2000) \rightarrow N\bar{K}^*(892), S=3/2, D\text{-wave}$	$(\Gamma_1 \Gamma_5)^{1/2} / \Gamma$
VALUE	DOCUMENT ID TECN COMMENT
$+0.09 \pm 0.03$	CAMERON 78B DPWA $K^- p \rightarrow N\bar{K}^*$

### $\Lambda(2000)$ FOOTNOTES

<sup>1</sup> 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  $J \leq 5/2$ .

<sup>2</sup> 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 <i>et al.</i>	(RHEL, LOIC) IJP
NAKKASYAN 75 NP B93 85	A. Nakkasyan	(CERN) IJP
BRANDSTET... 72 NP B39 13	A.A. Brandstetter <i>et al.</i>	(RHEL, CDEF+)
BARBARO-... 70 Duke Conf. 173	A. Barbaro-Galtieri	(LRL) IJP
Hyperon Resonances, 1970		