

**$\Lambda(2000)$**  $I(J^P) = 0(?^?)$  Status: \*

## OMITTED FROM SUMMARY TABLE

ZHANG 13A claims a  $J^P = 1/2^-$  state.

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**

<u>VALUE (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>\approx 2000</math> OUR ESTIMATE</b>			
2020 $\pm$ 16	ZHANG	13A	DPWA Multichannel
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**

<u>VALUE (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
255 $\pm$ 63	ZHANG	13A	DPWA Multichannel
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	Fraction ( $\Gamma_i/\Gamma$ )
$\Gamma_1$ $N\bar{K}$	(27 $\pm$ 6) %
$\Gamma_2$ $\Sigma\pi$	
$\Gamma_3$ $\Lambda\eta$	(16 $\pm$ 7) %
$\Gamma_4$ $\Lambda\omega$	
$\Gamma_5$ $N\bar{K}^*(892)$ , $S=1/2$ , $S$ -wave	
$\Gamma_6$ $N\bar{K}^*(892)$ , $S=3/2$ , $D$ -wave	

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

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

<u><math>\Gamma(N\bar{K})/\Gamma_{\text{total}}</math></u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>	<u><math>\Gamma_1/\Gamma</math></u>
<b>0.27<math>\pm</math>0.06</b>	ZHANG	13A	DPWA Multichannel	

$(\Gamma_i \Gamma_f)^{1/2} / \Gamma_{\text{total}}$ in $N\bar{K} \rightarrow \Lambda(2000) \rightarrow \Sigma \pi$	$(\Gamma_1 \Gamma_2)^{1/2} / \Gamma$		
VALUE	DOCUMENT ID	TECN	COMMENT
$-0.07 \pm 0.03$	ZHANG	13A	DPWA Multichannel
$-0.20 \pm 0.04$	BARBARO-...	70	DPWA $K^- p \rightarrow \Sigma \pi$

$\Gamma(\Lambda\eta) / \Gamma_{\text{total}}$	$\Gamma_3 / \Gamma$		
VALUE	DOCUMENT ID	TECN	COMMENT
<b><math>0.16 \pm 0.07</math></b>	ZHANG	13A	DPWA Multichannel

$(\Gamma_i \Gamma_f)^{1/2} / \Gamma_{\text{total}}$ in $N\bar{K} \rightarrow \Lambda(2000) \rightarrow \Lambda\omega$	$(\Gamma_1 \Gamma_4)^{1/2} / \Gamma$		
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 $N\bar{K} \rightarrow \Lambda(2000) \rightarrow N\bar{K}^*(892)$ , $S=1/2$ , $S$ -wave	$(\Gamma_1 \Gamma_5)^{1/2} / \Gamma$		
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 $N\bar{K} \rightarrow \Lambda(2000) \rightarrow N\bar{K}^*(892)$ , $S=3/2$ , $D$ -wave	$(\Gamma_1 \Gamma_6)^{1/2} / \Gamma$		
VALUE	DOCUMENT ID	TECN	COMMENT
$+0.34 \pm 0.05$	ZHANG	13A	DPWA Multichannel
$+0.09 \pm 0.03$	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

ZHANG	13A	PR C88 035205	H. Zhang <i>et al.</i>	(KSU)
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				