

$\Lambda(2000)$ $I(J^P) = 0(?^?)$ 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>
≈ 2000 OUR ESTIMATE			
2020 \pm 16	ZHANG 13A	DPWA	Multichannel
2030 \pm 30	CAMERON 78B	DPWA	$K^- p \rightarrow N\bar{K}^*$
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 \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	¹ BRANDSTET...72	DPWA	(lower mass)
73 to 154	¹ BRANDSTET...72	DPWA	(higher mass)
130 \pm 50	BARBARO-... 70	DPWA	$K^- p \rightarrow \Sigma\pi$

 $\Lambda(2000)$ DECAY MODES

	<u>Mode</u>	<u>Fraction (Γ_i/Γ)</u>
Γ_1	$N\bar{K}$	(27 \pm 6) %
Γ_2	$\Sigma\pi$	
Γ_3	$\Lambda\eta$	(16 \pm 7) %
Γ_4	$\Lambda\omega$	
Γ_5	$N\bar{K}^*(892)$, $S=1/2$, S -wave	
Γ_6	$N\bar{K}^*(892)$, $S=3/2$, D -wave	

$\Lambda(2000)$ BRANCHING RATIOS

See "Sign conventions for resonance couplings" in the Note on Λ and Σ Resonances.

$\Gamma(N\bar{K})/\Gamma_{\text{total}}$ Γ_1/Γ

VALUE	DOCUMENT ID	TECN	COMMENT
0.27 ± 0.06	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 ± 0.03	ZHANG	13A	DPWA Multichannel
−0.20 ± 0.04	BARBARO-...	70	DPWA $K^- p \rightarrow \Sigma\pi$

$\Gamma(\Lambda\eta)/\Gamma_{\text{total}}$ Γ_3/Γ

VALUE	DOCUMENT ID	TECN	COMMENT
0.16 ± 0.07	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	¹ BRANDSTET...72	DPWA	(lower mass)
0.04 to 0.15	¹ BRANDSTET...72	DPWA	(higher mass)

$(\Gamma_i\Gamma_f)^{1/2}/\Gamma_{\text{total}}$ in $N\bar{K} \rightarrow \Lambda(2000) \rightarrow N\bar{K}^*(892), S=1/2, S\text{-wave}$ $(\Gamma_1\Gamma_5)^{1/2}/\Gamma$

VALUE	DOCUMENT ID	TECN	COMMENT
−0.12 ± 0.03	² CAMERON	78B	DPWA $K^- p \rightarrow N\bar{K}^*$

$(\Gamma_i\Gamma_f)^{1/2}/\Gamma_{\text{total}}$ in $N\bar{K} \rightarrow \Lambda(2000) \rightarrow N\bar{K}^*(892), S=3/2, D\text{-wave}$ $(\Gamma_1\Gamma_6)^{1/2}/\Gamma$

VALUE	DOCUMENT ID	TECN	COMMENT
+0.34 ± 0.05	ZHANG	13A	DPWA Multichannel
+0.09 ± 0.03	CAMERON	78B	DPWA $K^- p \rightarrow N\bar{K}^*$

$\Lambda(2000)$ 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

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				