$\Lambda(2000)$

$I(J^P) = 0(?^?)$ 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 $N\overline{K}^*$). 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				
2020±16	ZHANG	13A	DPWA	Multichannel
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*
255±63	ZHANG	13A	DPWA	Multichannel
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	Fraction (Γ_i/Γ)
Γ_1	$N\overline{K}$	(27±6) %
Γ_2	$\Sigma\pi$	
Γ_3	$\Lambda\eta$	(16±7) %
Γ_4	$\Lambda\omega$	
Γ_5	$N\overline{K}^*(892)$, S=1/2, S-wave	
Γ_6	$N\overline{K}^*(892)$, S=3/2, D-wave	

Λ(2000) BRANCHING RATIOS

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

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

VALUE	DOCUMENT ID		TECN	COMMENT
0.27±0.06	ZHANG	13A	DPWA	Multichannel

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

VALUE	DOCUMENT ID		TECN	COMMENT
−0.07±0.03	ZHANG	13A	DPWA	Multichannel
−0.20±0.04	BARBARO-...	70	DPWA	$K^- p \to \Sigma\pi$

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

VALUE	DOCUMENT ID		TECN	COMMENT
0.16±0.07	ZHANG	13A	DPWA	Multichannel

$(\Gamma_i\Gamma_f)^{1/2}/\Gamma_{total}$ in $N\overline{K} \to \Lambda(2000) \to \Lambda\omega$ $(\Gamma_1\Gamma_4)^{1/2}/\Gamma$

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)

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

VALUE	DOCUMENT ID		TECN	COMMENT
−0.12±0.03	[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 $(\Gamma_1\Gamma_6)^{1/2}/\Gamma$

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

Λ(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.

Λ(2000) REFERENCES

ZHANG	13A	PR C88 035205	H. Zhang *et al.*	(KSU)
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