

$\Lambda(1800) S_{01}$

$$I(J^P) = 0(\frac{1}{2}^-) \text{ Status: } ***$$

This is the second resonance in the S_{01} wave, the first being the $\Lambda(1670)$.

$\Lambda(1800)$ MASS

VALUE (MeV)	DOCUMENT ID	TECN	COMMENT
1720 to 1850 (\approx 1800) OUR ESTIMATE			
1841 \pm 10	GOPAL	80	DPWA $\bar{K}N \rightarrow \bar{K}N$
1725 \pm 20	ALSTON-...	78	DPWA $\bar{K}N \rightarrow \bar{K}N$
1825 \pm 20	GOPAL	77	DPWA $\bar{K}N$ multichannel
1830 \pm 20	LANGBEIN	72	IPWA $\bar{K}N$ multichannel
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●			
1767 or 1842	¹ MARTIN	77	DPWA $\bar{K}N$ multichannel
1780	KIM	71	DPWA K-matrix analysis
1872 \pm 10	BRICMAN	70B	DPWA $\bar{K}N \rightarrow \bar{K}N$

$\Lambda(1800)$ WIDTH

VALUE (MeV)	DOCUMENT ID	TECN	COMMENT
200 to 400 (\approx 300) OUR ESTIMATE			
228 \pm 20	GOPAL	80	DPWA $\bar{K}N \rightarrow \bar{K}N$
185 \pm 20	ALSTON-...	78	DPWA $\bar{K}N \rightarrow \bar{K}N$
230 \pm 20	GOPAL	77	DPWA $\bar{K}N$ multichannel
70 \pm 15	LANGBEIN	72	IPWA $\bar{K}N$ multichannel
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●			
435 or 473	¹ MARTIN	77	DPWA $\bar{K}N$ multichannel
40	KIM	71	DPWA K-matrix analysis
100 \pm 20	BRICMAN	70B	DPWA $\bar{K}N \rightarrow \bar{K}N$

$\Lambda(1800)$ DECAY MODES

Mode	Fraction (Γ_i/Γ)
Γ_1 $N\bar{K}$	25–40 %
Γ_2 $\Sigma\pi$	seen
Γ_3 $\Sigma(1385)\pi$	seen
Γ_4 $N\bar{K}^*(892)$	seen
Γ_5 $N\bar{K}^*(892)$, $S=1/2$, S -wave	
Γ_6 $N\bar{K}^*(892)$, $S=3/2$, D -wave	

The above branching fractions are our estimates, not fits or averages.

$\Lambda(1800)$ 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	
0.25 to 0.40 OUR ESTIMATE				
0.36±0.04	GOPAL	80	DPWA $\bar{K}N \rightarrow \bar{K}N$	
0.28±0.05	ALSTON-...	78	DPWA $\bar{K}N \rightarrow \bar{K}N$	
0.35±0.15	LANGBEIN	72	IPWA $\bar{K}N$ multichannel	
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●				
0.37±0.05	GOPAL	77	DPWA See GOPAL 80	
1.21 or 0.70	¹ MARTIN	77	DPWA $\bar{K}N$ multichannel	
0.80	KIM	71	DPWA K-matrix analysis	
0.18±0.02	BRICMAN	70B	DPWA $\bar{K}N \rightarrow \bar{K}N$	

$(\Gamma_i\Gamma_f)^{1/2}/\Gamma_{\text{total}}$ in $N\bar{K} \rightarrow \Lambda(1800) \rightarrow \Sigma\pi$				$(\Gamma_1\Gamma_2)^{1/2}/\Gamma$
VALUE	DOCUMENT ID	TECN	COMMENT	
-0.08±0.05	GOPAL	77	DPWA $\bar{K}N$ multichannel	
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●				
-0.74 or -0.43	¹ MARTIN	77	DPWA $\bar{K}N$ multichannel	
0.24	KIM	71	DPWA K-matrix analysis	

$(\Gamma_i\Gamma_f)^{1/2}/\Gamma_{\text{total}}$ in $N\bar{K} \rightarrow \Lambda(1800) \rightarrow \Sigma(1385)\pi$				$(\Gamma_1\Gamma_3)^{1/2}/\Gamma$
VALUE	DOCUMENT ID	TECN	COMMENT	
+0.056±0.028	² CAMERON	78	DPWA $K^-p \rightarrow \Sigma(1385)\pi$	

$(\Gamma_i\Gamma_f)^{1/2}/\Gamma_{\text{total}}$ in $N\bar{K} \rightarrow \Lambda(1800) \rightarrow N\bar{K}^*(892), S=1/2, S\text{-wave}$				$(\Gamma_1\Gamma_5)^{1/2}/\Gamma$
VALUE	DOCUMENT ID	TECN	COMMENT	
-0.17±0.03	² CAMERON	78B	DPWA $K^-p \rightarrow N\bar{K}^*$	

$(\Gamma_i\Gamma_f)^{1/2}/\Gamma_{\text{total}}$ in $N\bar{K} \rightarrow \Lambda(1800) \rightarrow N\bar{K}^*(892), S=3/2, D\text{-wave}$				$(\Gamma_1\Gamma_6)^{1/2}/\Gamma$
VALUE	DOCUMENT ID	TECN	COMMENT	
-0.13±0.04	CAMERON	78B	DPWA $K^-p \rightarrow N\bar{K}^*$	

$\Lambda(1800)$ FOOTNOTES

¹ The two MARTIN 77 values are from a T-matrix pole and from a Breit-Wigner fit.

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

$\Lambda(1800)$ REFERENCES

GOPAL	80	Toronto Conf.	159		(RHEL) IJP
ALSTON-...	78	PR D18	182	Alston-Garnjost, Kenney+	(LBL, MTHO, CERN) IJP
Also	77	PRL 38	1007	Alston-Garnjost, Kenney+	(LBL, MTHO, CERN) IJP
CAMERON	78	NP B143	189	+Franek, Gopal, Bacon, Butterworth+	(RHEL, LOIC) IJP
CAMERON	78B	NP B146	327	+Franek, Gopal, Kalmus, McPherson+	(RHEL, LOIC) IJP
GOPAL	77	NP B119	362	+Ross, VanHorn, McPherson+	(LOIC, RHEL) IJP
MARTIN	77	NP B127	349	+Pidcock, Moorhouse	(LOUC, GLAS) IJP
Also	77B	NP B126	266	Martin, Pidcock	(LOUC)
Also	77C	NP B126	285	Martin, Pidcock	(LOUC) IJP
LANGBEIN	72	NP B47	477	+Wagner	(MPIM) IJP
KIM	71	PRL 27	356		(HARV) IJP
Also	70	Duke Conf.	161	Kim	(HARV) IJP
BRICMAN	70B	PL 33B	511	+Ferro-Luzzi, Lagnaux	(CERN) IJP
