

$\Lambda(1890) P_{03}$

$I(J^P) = 0(\frac{3}{2}^+)$ Status: ****

For results published before 1974 (they are now obsolete), see our 1982 edition Physics Letters **111B** 1 (1982).

The $J^P = 3/2^+$ assignment is consistent with all available data (including polarization) and recent partial-wave analyses. The dominant inelastic modes remain unknown.

$\Lambda(1890)$ MASS

VALUE (MeV)	DOCUMENT ID	TECN	COMMENT
1850 to 1910 (≈ 1890) OUR ESTIMATE			
1897 \pm 5	GOPAL	80	DPWA $\bar{K}N \rightarrow \bar{K}N$
1908 \pm 10	ALSTON-...	78	DPWA $\bar{K}N \rightarrow \bar{K}N$
1900 \pm 5	GOPAL	77	DPWA $\bar{K}N$ multichannel
1894 \pm 10	HEMINGWAY	75	DPWA $K^- p \rightarrow \bar{K}N$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●			
1856 or 1868	¹ MARTIN	77	DPWA $\bar{K}N$ multichannel
1900	² NAKKASYAN	75	DPWA $K^- p \rightarrow \Lambda\omega$

$\Lambda(1890)$ WIDTH

VALUE (MeV)	DOCUMENT ID	TECN	COMMENT
60 to 200 (≈ 100) OUR ESTIMATE			
74 \pm 10	GOPAL	80	DPWA $\bar{K}N \rightarrow \bar{K}N$
119 \pm 20	ALSTON-...	78	DPWA $\bar{K}N \rightarrow \bar{K}N$
72 \pm 10	GOPAL	77	DPWA $\bar{K}N$ multichannel
107 \pm 10	HEMINGWAY	75	DPWA $K^- p \rightarrow \bar{K}N$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●			
191 or 193	¹ MARTIN	77	DPWA $\bar{K}N$ multichannel
100	² NAKKASYAN	75	DPWA $K^- p \rightarrow \Lambda\omega$

$\Lambda(1890)$ DECAY MODES

Mode	Fraction (Γ_i/Γ)
Γ_1 $N\bar{K}$	20–35 %
Γ_2 $\Sigma\pi$	3–10 %
Γ_3 $\Sigma(1385)\pi$	seen
Γ_4 $\Sigma(1385)\pi$, P -wave	
Γ_5 $\Sigma(1385)\pi$, F -wave	
Γ_6 $N\bar{K}^*(892)$	seen
Γ_7 $N\bar{K}^*(892)$, $S=1/2$, P -wave	
Γ_8 $\Lambda\omega$	

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

$\Lambda(1890)$ 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

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
0.20 to 0.35 OUR ESTIMATE			
0.20±0.02	GOPAL	80	DPWA $\bar{K}N \rightarrow \bar{K}N$
0.34±0.05	ALSTON-...	78	DPWA $\bar{K}N \rightarrow \bar{K}N$
0.24±0.04	HEMINGWAY	75	DPWA $K^-p \rightarrow \bar{K}N$
• • • We do not use the following data for averages, fits, limits, etc. • • •			
0.18±0.02	GOPAL	77	DPWA See GOPAL 80
0.36 or 0.34	¹ MARTIN	77	DPWA $\bar{K}N$ multichannel

$(\Gamma_i\Gamma_f)^{1/2}/\Gamma_{\text{total}}$ in $N\bar{K} \rightarrow \Lambda(1890) \rightarrow \Sigma\pi$ $(\Gamma_1\Gamma_2)^{1/2}/\Gamma$

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
-0.09±0.03	GOPAL	77	DPWA $\bar{K}N$ multichannel
• • • We do not use the following data for averages, fits, limits, etc. • • •			
+0.15 or +0.14	¹ MARTIN	77	DPWA $\bar{K}N$ multichannel

$(\Gamma_i\Gamma_f)^{1/2}/\Gamma_{\text{total}}$ in $N\bar{K} \rightarrow \Lambda(1890) \rightarrow \Lambda\omega$ $(\Gamma_1\Gamma_8)^{1/2}/\Gamma$

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
seen	BACCARI	77	IPWA $K^-p \rightarrow \Lambda\omega$
0.032	² NAKKASYAN	75	DPWA $K^-p \rightarrow \Lambda\omega$

$(\Gamma_i\Gamma_f)^{1/2}/\Gamma_{\text{total}}$ in $N\bar{K} \rightarrow \Lambda(1890) \rightarrow \Sigma(1385)\pi$, *P-wave* $(\Gamma_1\Gamma_4)^{1/2}/\Gamma$

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<0.03	CAMERON	78	DPWA $K^-p \rightarrow \Sigma(1385)\pi$

$(\Gamma_i\Gamma_f)^{1/2}/\Gamma_{\text{total}}$ in $N\bar{K} \rightarrow \Lambda(1890) \rightarrow \Sigma(1385)\pi$, *F-wave* $(\Gamma_1\Gamma_5)^{1/2}/\Gamma$

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
-0.126±0.055	³ CAMERON	78	DPWA $K^-p \rightarrow \Sigma(1385)\pi$

$(\Gamma_i\Gamma_f)^{1/2}/\Gamma_{\text{total}}$ in $N\bar{K} \rightarrow \Lambda(1890) \rightarrow N\bar{K}^*(892)$ $(\Gamma_1\Gamma_6)^{1/2}/\Gamma$

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
-0.07±0.03	^{3,4} CAMERON	78B	DPWA $K^-p \rightarrow N\bar{K}^*$

$\Lambda(1890)$ FOOTNOTES

- ¹ The two MARTIN 77 values are from a T-matrix pole and from a Breit-Wigner fit.
- ² Found in one of two best solutions.
- ³ The published sign has been changed to be in accord with the baryon-first convention.
- ⁴ Upper limits on the P_3 and F_3 waves are each 0.03.

$\Lambda(1890)$ REFERENCES

PDG	82	PL 111B 1	M. Roos <i>et al.</i>	(HELS, CIT, CERN)
GOPAL	80	Toronto Conf. 159	G.P. Gopal	(RHEL) IJP
ALSTON-...	78	PR D18 182	M. Alston-Garnjost <i>et al.</i>	(LBL, MTHO+) IJP
Also		PRL 38 1007	M. Alston-Garnjost <i>et al.</i>	(LBL, MTHO+) IJP
CAMERON	78	NP B143 189	W. Cameron <i>et al.</i>	(RHEL, LOIC) IJP
CAMERON	78B	NP B146 327	W. Cameron <i>et al.</i>	(RHEL, LOIC) IJP
BACCARI	77	NC 41A 96	B. Baccari <i>et al.</i>	(SACL, CDEF) IJP
GOPAL	77	NP B119 362	G.P. Gopal <i>et al.</i>	(LOIC, RHEL) IJP
MARTIN	77	NP B127 349	B.R. Martin, M.K. Pidcock, R.G. Moorhouse	(LOUC+) IJP
Also		NP B126 266	B.R. Martin, M.K. Pidcock	(LOUC)
Also		NP B126 285	B.R. Martin, M.K. Pidcock	(LOUC) IJP
HEMINGWAY	75	NP B91 12	R.J. Hemingway <i>et al.</i>	(CERN, HEIDH, MPIM) IJP
NAKKASYAN	75	NP B93 85	A. Nakkasyan	(CERN) IJP
