

$\Lambda(1890) \ 3/2^+$ $I(J^P) = 0(\frac{3}{2}^+)$ 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

<u>VALUE (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
1850 to 1910 (≈ 1890) OUR ESTIMATE			
1900 ± 5	ZHANG	13A	DPWA Multichannel
1897 ± 5	GOPAL	80	DPWA $\bar{K}N \rightarrow \bar{K}N$
1908 ± 10	ALSTON-...	78	DPWA $\bar{K}N \rightarrow \bar{K}N$
1900 ± 5	GOPAL	77	DPWA $\bar{K}N$ multichannel
1894 ± 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

<u>VALUE (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
60 to 200 (≈ 100) OUR ESTIMATE			
161 ± 15	ZHANG	13A	DPWA Multichannel
74 ± 10	GOPAL	80	DPWA $\bar{K}N \rightarrow \bar{K}N$
119 ± 20	ALSTON-...	78	DPWA $\bar{K}N \rightarrow \bar{K}N$
72 ± 10	GOPAL	77	DPWA $\bar{K}N$ multichannel
107 ± 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 $K^- p \rightarrow \Lambda\omega$

 $\Lambda(1890)$ POLE POSITION**REAL PART**

<u>VALUE (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●			
1876	ZHANG	13A	DPWA Multichannel

-2×IMAGINARY PART

<u>VALUE (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●			
145	ZHANG	13A	DPWA Multichannel

$\Lambda(1890)$ 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 $\Sigma(1385)\pi$, <i>P</i> -wave	
Γ_5 $\Sigma(1385)\pi$, <i>F</i> -wave	
Γ_6 $N\bar{K}^*(892)$	seen
Γ_7 $N\bar{K}^*(892)$, $S=1/2$	
Γ_8 $N\bar{K}^*(892)$, $S=3/2$, <i>F</i> -wave	
Γ_9 $\Lambda\omega$	

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			
0.37 ± 0.03	ZHANG	13A	DPWA Multichannel
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 ± 0.02	ZHANG	13A	DPWA Multichannel
-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 $N\bar{K} \rightarrow \Lambda(1890) \rightarrow \Sigma(1385)\pi$, *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>
-0.31 ± 0.04	ZHANG	13A	DPWA Multichannel
-0.126 ± 0.055	³ CAMERON	78	DPWA $K^-p \rightarrow \Sigma(1385)\pi$

$(\Gamma_i \Gamma_f)^{1/2} / \Gamma_{\text{total}}$ in $N\bar{K} \rightarrow \Lambda(1890) \rightarrow N\bar{K}^*(892)$, $S=1/2$ $(\Gamma_1 \Gamma_7)^{1/2} / \Gamma$

VALUE	DOCUMENT ID	TECN	COMMENT
-0.17 ± 0.05	ZHANG	13A	DPWA Multichannel
-0.07 ± 0.03	^{3,4} CAMERON	78B	DPWA $K^- p \rightarrow N\bar{K}^*$

$(\Gamma_i \Gamma_f)^{1/2} / \Gamma_{\text{total}}$ in $N\bar{K} \rightarrow \Lambda(1890) \rightarrow N\bar{K}^*(892)$, $S=3/2$, F -wave $(\Gamma_1 \Gamma_8)^{1/2} / \Gamma$

VALUE	DOCUMENT ID	TECN	COMMENT
-0.11 ± 0.03	ZHANG	13A	DPWA Multichannel

$(\Gamma_i \Gamma_f)^{1/2} / \Gamma_{\text{total}}$ in $N\bar{K} \rightarrow \Lambda(1890) \rightarrow \Lambda\omega$ $(\Gamma_1 \Gamma_9)^{1/2} / \Gamma$

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

$\Lambda(1890)$ 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

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