$\Lambda(1890)\ 3/2^+$

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

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

$\Lambda(1890)$ POLE POSITION

REAL PART

VALUE (MeV)	DOCUMENT ID		TECN	COMMENT
1872±5	SARANTSEV	19	DPWA	$\overline{K}N$ multichannel
• • • We do not use the following data for averages, fits, limits, etc. • • •				
1859^{+5}_{-7}	[1] KAMANO	15	DPWA	Multichannel
1876	ZHANG	13A	DPWA	Multichannel

[1] From the preferred solution A in KAMANO 15, incompatible with solution B.

−2×IMAGINARY PART

VALUE (MeV)	DOCUMENT ID		TECN	COMMENT
101±10	SARANTSEV	19	DPWA	$\overline{K}N$ multichannel
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$113^{+20}_{-\ 4}$	[1] KAMANO	15	DPWA	$\overline{K}N$ multichannel
145	ZHANG	13A	DPWA	$\overline{K}N$ multichannel

[1] From the preferred solution A in KAMANO 15, incompatible with solution B.

$\Lambda(1890)$ POLE RESIDUE

The "normalized residue" is the residue divided by $\Gamma_{pole}/2$.

Normalized residue in $\overline{K}N \to \Lambda(1890) \to \overline{K}N$

MODULUS	PHASE (°)	DOCUMENT ID		TECN	COMMENT
0.30 ±0.06	**0 ± 10**	SARANTSEV	19	DPWA	$\overline{K}N$ multichannel
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.241	−23	[1] KAMANO	15	DPWA	$\overline{K}N$ multichannel

[1] From the preferred solution A in KAMANO 15.

Normalized residue in $N\overline{K} \to \Lambda(1890) \to \Sigma\pi$

MODULUS	PHASE (°)	DOCUMENT ID		TECN	COMMENT
0.14 ±0.05	**148 ± 12**	SARANTSEV	19	DPWA	$\overline{K}N$ multichannel
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.101	104	[1] KAMANO	15	DPWA	$\overline{K}N$ multichannel

[1] From the preferred solution A in KAMANO 15.

Normalized residue in $N\overline{K} \to \Lambda(1890) \to \Lambda\eta$

MODULUS	PHASE (°)	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.0485	−54	[1] KAMANO	15	DPWA	Multichannel

[1] From the preferred solution A in KAMANO 15.

Normalized residue in $N\overline{K} \rightarrow \Lambda(1890) \rightarrow \Xi K$

MODULUS	PHASE (°)	DOCUMENT ID		TECN	COMMENT
0.065 ±0.020	**160 ± 30**	SARANTSEV	19	DPWA	$\overline{K}N$ multichannel
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.0562	−85	[1] KAMANO	15	DPWA	$\overline{K}N$ multichannel

[1] From the preferred solution A in KAMANO 15.

Normalized residue in $N\overline{K} \rightarrow \Lambda(1890) \rightarrow \Sigma(1385)\pi$, P-wave

MODULUS	PHASE (°)	DOCUMENT ID		TECN	COMMENT
0.11 ±0.05	**−160 ± 45**	SARANTSEV	19	DPWA	$\overline{K}N$ multichannel
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.295	−40	[1] KAMANO	15	DPWA	$\overline{K}N$ multichannel

[1] From the preferred solution A in KAMANO 15.

Normalized residue in $N\overline{K} \rightarrow \Lambda(1890) \rightarrow \Sigma(1385)\pi$, F-wave

MODULUS	PHASE (°)	DOCUMENT ID		TECN	COMMENT
0.10 ±0.04	**10 ± 50**	SARANTSEV	19	DPWA	$\overline{K}N$ multichannel
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.064	127	[1] KAMANO	15	DPWA	$\overline{K}N$ multichannel

[1] From the preferred solution A in KAMANO 15.

Normalized residue in $N\overline{K} \rightarrow \Lambda(1890) \rightarrow N\overline{K}^*(892)$, S=1/2 , P-wave

MODULUS	PHASE (°)	DOCUMENT ID		TECN	COMMENT
0.03 ±0.03		SARANTSEV	19	DPWA	$\overline{K}N$ multichannel
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.188	−160	[1] KAMANO	15	DPWA	$\overline{K}N$ multichannel

[1] From the preferred solution A in KAMANO 15.

Normalized residue in $N\overline{K} \rightarrow \Lambda(1890) \rightarrow N\overline{K}^*(892)$, S=3/2 , P-wave

MODULUS	PHASE (°)	DOCUMENT ID		TECN	COMMENT
0.05 ±0.03	**180 ± 40**	SARANTSEV	19	DPWA	$\overline{K}N$ multichannel
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.209	15	[1] KAMANO	15	DPWA	$\overline{K}N$ multichannel

[1] From the preferred solution A in KAMANO 15.

Normalized residue in $N\overline{K} \rightarrow \Lambda(1890) \rightarrow N\overline{K}^*(892)$, S=3/2, F-wave

MODULUS	PHASE (°)	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.0141	129	[1] KAMANO	15	DPWA	Multichannel

[1] From the preferred solution A in KAMANO 15.

Normalized residue in $N\overline{K} \rightarrow \Lambda(1890) \rightarrow \Lambda\omega$, S=1/2 , P-wave

MODULUS	PHASE (°)	DOCUMENT ID		TECN	COMMENT
0.24±0.06	**15 ± 20**	SARANTSEV	19	DPWA	$\overline{K}N$ multichannel

Normalized residue in $N\overline{K} \rightarrow \Lambda(1890) \rightarrow \Lambda\omega$, S=3/2 , P-wave

MODULUS	PHASE (°)	DOCUMENT ID		TECN	COMMENT
0.15±0.08	**−165 ± 20**	SARANTSEV	19	DPWA	$\overline{K}N$ multichannel

Λ(1890) MASS

VALUE (MeV)	DOCUMENT ID		TECN	COMMENT
1870 to 1910 (≈ 1890) OUR ESTIMATE				
1873± 5	SARANTSEV	19	DPWA	$\overline{K}N$ multichannel
1900± 5	ZHANG	13A	DPWA	$\overline{K}N$ multichannel
1897± 5	GOPAL	80	DPWA	$\overline{K}N \rightarrow \overline{K}N$
1908±10	ALSTON-...	78	DPWA	$\overline{K}N \rightarrow \overline{K}N$
1894±10	HEMINGWAY	75	DPWA	$K^- p \rightarrow \overline{K}N$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
1900± 5	GOPAL	77	DPWA	$\overline{K}N$ multichannel
1856 or 1868	[1] MARTIN	77	DPWA	$\overline{K}N$ multichannel
1900	[2] NAKKASYAN	75	DPWA	$K^- p \rightarrow \Lambda\omega$

[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.

Λ(1890) WIDTH

VALUE (MeV)	DOCUMENT ID		TECN	COMMENT
80 to 160 (≈ 120) OUR ESTIMATE				
103±10	SARANTSEV	19	DPWA	$\overline{K}N$ multichannel
161±15	ZHANG	13A	DPWA	$\overline{K}N$ multichannel
74±10	GOPAL	80	DPWA	$\overline{K}N \rightarrow \overline{K}N$
119±20	ALSTON-...	78	DPWA	$\overline{K}N \rightarrow \overline{K}N$
107±10	HEMINGWAY	75	DPWA	$K^- p \rightarrow \overline{K}N$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
72±10	GOPAL	77	DPWA	$\overline{K}N$ multichannel
191 or 193	[1] MARTIN	77	DPWA	$\overline{K}N$ multichannel
100	[2] NAKKASYAN	75	DPWA	$K^- p \rightarrow \Lambda\omega$

[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.

Λ(1890) DECAY MODES

	Mode	Fraction (Γ_i/Γ)
Γ_1	$N\overline{K}$	0.24 to 0.36
Γ_2	$\Sigma\pi$	3–10 %
Γ_3	$\Lambda\eta$	
Γ_4	ΞK	
Γ_5	$\Sigma(1385)\pi$	seen
Γ_6	$\Sigma(1385)\pi$, P-wave	(6.0 ±3.0) %

Γ_7	$\Sigma(1385)\pi$, F-wave	(4.0 ±2.0) %
Γ_8	$N\overline{K}^*(892)$	seen
Γ_9	$N\overline{K}^*(892)$, S=1/2	
Γ_{10}	$N\overline{K}^*(892)$, S=1/2, P-wave	
Γ_{11}	$N\overline{K}^*(892)$, S=3/2, P-wave	
Γ_{12}	$N\overline{K}^*(892)$, S=3/2, F-wave	
Γ_{13}	$\Lambda\omega$	

Λ(1890) 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
0.24 to 0.36 OUR ESTIMATE				
0.30 ±0.06	SARANTSEV	19	DPWA	$\overline{K}N$ multichannel
0.37 ±0.03	ZHANG	13A	DPWA	$\overline{K}N$ multichannel
0.20 ±0.02	GOPAL	80	DPWA	$\overline{K}N \to \overline{K}N$
0.34 ±0.05	ALSTON-...	78	DPWA	$\overline{K}N \to \overline{K}N$
0.24 ±0.04	HEMINGWAY	75	DPWA	$K^- p \to \overline{K}N$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.305	[1] KAMANO	15	DPWA	$\overline{K}N$ multichannel
0.18 ±0.02	GOPAL	77	DPWA	See GOPAL 80
0.36 or 0.34	[2] MARTIN	77	DPWA	$\overline{K}N$ multichannel

[1] From the preferred solution A in KAMANO 15.
[2] The two MARTIN 77 values are from a T-matrix pole and from a Breit-Wigner fit.

$\Gamma(\Sigma\pi)/\Gamma_{total}$ — Γ_2/Γ

VALUE	DOCUMENT ID		TECN	COMMENT
6 ±2	SARANTSEV	19	DPWA	$\overline{K}N$ multichannel
<0.03	LANGBEIN	72	IPWA	$\overline{K}N$ multichannel
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.04	[1] KAMANO	15	DPWA	$\overline{K}N$ multichannel

[1] From the preferred solution A in KAMANO 15.

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

VALUE	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.012	[1] KAMANO	15	DPWA	$\overline{K}N$ multichannel

[1] From the preferred solution A in KAMANO 15.

$\Gamma(\Xi K)/\Gamma_{total}$ — Γ_4/Γ

VALUE	DOCUMENT ID		TECN	COMMENT
~ 0.01	SARANTSEV	19	DPWA	$\overline{K}N$ multichannel
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.009	[1] KAMANO	15	DPWA	$\overline{K}N$ multichannel

[1] From the preferred solution A in KAMANO 15.

$\Gamma(\Sigma(1385)\pi$, P-wave$)/\Gamma_{total}$ — Γ_6/Γ

VALUE	DOCUMENT ID		TECN	COMMENT
0.06 ±0.03	SARANTSEV	19	DPWA	$\overline{K}N$ multichannel
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.453	[1] KAMANO	15	DPWA	$\overline{K}N$ multichannel

[1] From the preferred solution A in KAMANO 15.

$\Gamma(\Sigma(1385)\pi$, F-wave$)/\Gamma_{total}$ — Γ_7/Γ

VALUE	DOCUMENT ID		TECN	COMMENT
0.04 ±0.02	SARANTSEV	19	DPWA	$\overline{K}N$ multichannel
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.019	[1] KAMANO	15	DPWA	$\overline{K}N$ multichannel

[1] From the preferred solution A in KAMANO 15.

$\Gamma(N\overline{K}^*(892)$, S=1/2, P-wave$)/\Gamma_{total}$ — Γ_{10}/Γ

VALUE	DOCUMENT ID		TECN	COMMENT
<0.01	SARANTSEV	19	DPWA	$\overline{K}N$ multichannel
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.073	[1] KAMANO	15	DPWA	$\overline{K}N$ multichannel

[1] From the preferred solution A in KAMANO 15.

$\Gamma(N\overline{K}^*(892)$, S=3/2, P-wave$)/\Gamma_{total}$ — Γ_{11}/Γ

VALUE	DOCUMENT ID		TECN	COMMENT
~ 0.01	SARANTSEV	19	DPWA	$\overline{K}N$ multichannel
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.088	[1] KAMANO	15	DPWA	$\overline{K}N$ multichannel

[1] From the preferred solution A in KAMANO 15.

$\Gamma(N\overline{K}^*(892)$, S=3/2, F-wave$)/\Gamma_{total}$ — Γ_{12}/Γ

VALUE	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.001	[1] KAMANO	15	DPWA	$\overline{K}N$ multichannel

[1] From the preferred solution A in KAMANO 15.

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

VALUE	DOCUMENT ID		TECN	COMMENT
−0.09±0.02	ZHANG	13A	DPWA	$\overline{K}N$ multichannel
−0.09±0.03	GOPAL	77	DPWA	$\overline{K}N$ multichannel
• • • We do not use the following data for averages, fits, limits, etc. • • •				
+0.15 or +0.14	[1] MARTIN	77	DPWA	$\overline{K}N$ multichannel

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

$(\Gamma_i\Gamma_f)^{1/2}/\Gamma_{total}$ in $N\overline{K} \rightarrow \Lambda(1890) \rightarrow \Sigma(1385)\pi$, P-wave — $(\Gamma_1\Gamma_6)^{1/2}/\Gamma$

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

$(\Gamma_i\Gamma_f)^{1/2}/\Gamma_{total}$ in $N\overline{K} \to \Lambda(1890) \to \Sigma(1385)\pi$, F-wave $(\Gamma_1\Gamma_7)^{1/2}/\Gamma$

VALUE	DOCUMENT ID		TECN	COMMENT
$-0.31\ \pm0.04$	ZHANG	13A	DPWA	$\overline{K}N$ multichannel
-0.126 ± 0.055	[1] CAMERON	78	DPWA	$K^- p \to \Sigma(1385)\pi$

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

$(\Gamma_i\Gamma_f)^{1/2}/\Gamma_{total}$ in $N\overline{K} \to \Lambda(1890) \to N\overline{K}^*(892)$, S=1/2 $(\Gamma_1\Gamma_9)^{1/2}/\Gamma$

VALUE	DOCUMENT ID		TECN	COMMENT
-0.17 ± 0.05	ZHANG	13A	DPWA	$\overline{K}N$ multichannel
-0.07 ± 0.03	[1,2] CAMERON	78B	DPWA	$K^- p \to N\overline{K}^*$

[1] Upper limits on the P_3 and F_3 waves are each 0.03.

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

$(\Gamma_i\Gamma_f)^{1/2}/\Gamma_{total}$ in $N\overline{K} \to \Lambda(1890) \to N\overline{K}^*(892)$, S=3/2, F-wave $(\Gamma_1\Gamma_{12})^{1/2}/\Gamma$

VALUE	DOCUMENT ID		TECN	COMMENT
-0.11 ± 0.03	ZHANG	13A	DPWA	$\overline{K}N$ multichannel

$(\Gamma_i\Gamma_f)^{1/2}/\Gamma_{total}$ in $N\overline{K} \to \Lambda(1890) \to \Lambda\omega$ $(\Gamma_1\Gamma_{13})^{1/2}/\Gamma$

VALUE	DOCUMENT ID		TECN	COMMENT
seen	BACCARI	77	IPWA	$K^- p \to \Lambda\omega$
0.032	[1] NAKKASYAN	75	DPWA	$K^- p \to \Lambda\omega$

[1] Found in one of two best solutions.

Λ(1890) REFERENCES

SARANTSEV	19	EPJ A55 180	A.V. Sarantsev et al.	(BONN, PNPI)
KAMANO	15	PR C92 025205	H. Kamano et al.	(ANL, OSAK)
ZHANG	13A	PR C88 035205	H. Zhang et al.	(KSU)
PDG	82	PL 111B 1	M. Roos et al.	(HELS, CIT, CERN)
GOPAL	80	Toronto Conf. 159	G.P. Gopal	(RHEL) IJP
ALSTON-...	78	PR D18 182	M. Alston-Garnjost et al.	(LBL, MTHO+) IJP
Also		PRL 38 1007	M. Alston-Garnjost et al.	(LBL, MTHO+) IJP
CAMERON	78	NP B143 189	W. Cameron et al.	(RHEL, LOIC) IJP
CAMERON	78B	NP B146 327	W. Cameron et al.	(RHEL, LOIC) IJP
BACCARI	77	NC 41A 96	B. Baccari et al.	(SACL, CDEF) IJP
GOPAL	77	NP B119 362	G.P. Gopal et al.	(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 et al.	(CERN, HEIDH, MPIM) IJP
NAKKASYAN	75	NP B93 85	A. Nakkasyan	(CERN) IJP
LANGBEIN	72	NP B47 477	W. Langbein, F. Wagner	(MPIM) IJP