NODE=B056

$\Lambda(1830)$ $5/2^-$

$I(J^P) = 0(\frac{5}{2}^-)$ Status: ∗∗∗∗

NODE=B056

For results published before 1973 (they are now obsolete), see our 1982 edition Physics Letters **111B** 1 (1982).

The best evidence for this resonance is in the $\Sigma\pi$ channel.

$\Lambda(1830)$ POLE POSITION

NODE=B056225

REAL PART

NODE=B056RE
NODE=B056RE

VALUE (MeV)	*DOCUMENT ID*		*TECN*	*COMMENT*
1800 to 1860 (≈ 1830) OUR ESTIMATE				
1819.5 ± 3.0	SARANTSEV	19	DPWA	$\overline{K}N$ multichannel
1899 $^{+35}_{-37}$	[1] KAMANO	15	DPWA	Multichannel
• • • We do not use the following data for averages, fits, limits, etc. • • •				
1766 $^{+37}_{-34}$	[2] KAMANO	15	DPWA	Multichannel
1809	ZHANG	13A	DPWA	Multichannel

→ UNCHECKED ←

OCCUR=3

[1] The preferred solution A in KAMANO 15 reports two poles. This entry is from the preferred solution A.

NODE=B056RE;LINKAGE=B

[2] From the preferred solution A in KAMANO 15. Not seen in solution B.

NODE=B056RE;LINKAGE=A

−2×IMAGINARY PART

NODE=B056IM
NODE=B056IM

VALUE (MeV)	*DOCUMENT ID*		*TECN*	*COMMENT*
50 to 80 (≈ 65) OUR ESTIMATE				
62 ± 5	SARANTSEV	19	DPWA	$\overline{K}N$ multichannel
80 $^{+100}_{-34}$	[1] KAMANO	15	DPWA	Multichannel
• • • We do not use the following data for averages, fits, limits, etc. • • •				
212 $^{+94}_{-62}$	[2] KAMANO	15	DPWA	Multichannel
109	ZHANG	13A	DPWA	Multichannel

→ UNCHECKED ←

OCCUR=2

[1] The preferred solution A in KAMANO 15 reports two poles. This entry is from the preferred solution A.

NODE=B056IM;LINKAGE=B

[2] From the preferred solution A in KAMANO 15. Not seen in solution B.

NODE=B056IM;LINKAGE=A

$\Lambda(1830)$ POLE RESIDUES

NODE=B056250

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

NODE=B056250

Normalized residue in $N\overline{K} \to \Lambda(1830) \to N\overline{K}$

NODE=B056A00
NODE=B056A00

MODULUS	*PHASE* (°)	*DOCUMENT ID*		*TECN*	*COMMENT*
0.055 ±0.010	**20 ± 14**	SARANTSEV	19	DPWA	$\overline{K}N$ multichannel
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.00502	−80	[1] KAMANO	15	DPWA	Multichannel

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

NODE=B056A00;LINKAGE=A

Normalized residue in $N\overline{K} \to \Lambda(1830) \to \Sigma\pi$

NODE=B056A01
NODE=B056A01

MODULUS	*PHASE* (°)	*DOCUMENT ID*		*TECN*	*COMMENT*
0.15 ±0.03	**180 ± 10**	SARANTSEV	19	DPWA	$\overline{K}N$ multichannel
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.00581	179	[1] KAMANO	15	DPWA	Multichannel

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

NODE=B056A01;LINKAGE=A

Normalized residue in $N\overline{K} \to \Lambda(1830) \to \Lambda\eta$

NODE=B056A02
NODE=B056A02

MODULUS	*PHASE* (°)	*DOCUMENT ID*		*TECN*	*COMMENT*
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.00941	−65	[1] KAMANO	15	DPWA	Multichannel

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

NODE=B056A02;LINKAGE=A

Normalized residue in $N\overline{K} \to \Lambda(1830) \to \Xi K$

NODE=B056A05
NODE=B056A05

MODULUS	*PHASE* (°)	*DOCUMENT ID*		*TECN*	*COMMENT*
0.010 ±0.005	**65 ± 20**	SARANTSEV	19	DPWA	$\overline{K}N$ multichannel
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.0477	94	[1] KAMANO	15	DPWA	Multichannel

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

NODE=B056A05;LINKAGE=A

Normalized residue in $N\overline{K} \to \Lambda(1830) \to \Sigma(1385)\pi$, D-wave

NODE=B056A03
NODE=B056A03

MODULUS	PHASE (°)	DOCUMENT ID		TECN	COMMENT
0.10 ±0.04	**10 ± 25**	SARANTSEV	19	DPWA	$\overline{K}N$ multichannel
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.0237	113	[1] KAMANO	15	DPWA	Multichannel

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

NODE=B056A03;LINKAGE=A

Normalized residue in $N\overline{K} \to \Lambda(1830) \to \Sigma(1385)\pi$, G-wave

NODE=B056A04
NODE=B056A04

MODULUS	PHASE (°)	DOCUMENT ID		TECN	COMMENT
0.03 ±0.02		SARANTSEV	19	DPWA	$\overline{K}N$ multichannel
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.000726	127	[1] KAMANO	15	DPWA	Multichannel

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

NODE=B056A04;LINKAGE=A

Normalized residue in $N\overline{K} \to \Lambda(1830) \to N\overline{K}^*(892)$, S=1/2 , D-wave

NODE=B056A06
NODE=B056A06

MODULUS	PHASE (°)	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.0278	−177	[1] KAMANO	15	DPWA	Multichannel

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

NODE=B056A06;LINKAGE=A

Normalized residue in $N\overline{K} \to \Lambda(1830) \to N\overline{K}^*(892)$, S=3/2 , D-wave

NODE=B056A07
NODE=B056A07

MODULUS	PHASE (°)	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.0255	3	[1] KAMANO	15	DPWA	Multichannel

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

NODE=B056A07;LINKAGE=A

Normalized residue in $N\overline{K} \to \Lambda(1830) \to N\overline{K}^*(892)$, S=3/2 , G-wave

NODE=B056A08
NODE=B056A08

MODULUS	PHASE (°)	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.00773	−17	[1] KAMANO	15	DPWA	Multichannel

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

NODE=B056A08;LINKAGE=A

Normalized residue in $N\overline{K} \to \Lambda(1830) \to \Lambda\omega$, S=1/2 , D-wave

NODE=B056A09
NODE=B056A09

MODULUS	PHASE (°)	DOCUMENT ID		TECN	COMMENT
0.04±0.03		SARANTSEV	19	DPWA	$\overline{K}N$ multichannel

Normalized residue in $N\overline{K} \to \Lambda(1830) \to \Lambda\omega$, S=3/2 , D-wave

NODE=B056A10
NODE=B056A10

MODULUS	PHASE (°)	DOCUMENT ID		TECN	COMMENT
0.05±0.03	**−110 ± 35**	SARANTSEV	19	DPWA	$\overline{K}N$ multichannel

Λ(1830) MASS

NODE=B056M

NODE=B056M
→ UNCHECKED ←

VALUE (MeV)	DOCUMENT ID		TECN	COMMENT
1820 to 1830 (≈ 1825) OUR ESTIMATE				
1821± 3	SARANTSEV	19	DPWA	$\overline{K}N$ multichannel
1820± 4	ZHANG	13A	DPWA	Multichannel
1831±10	GOPAL	80	DPWA	$\overline{K}N \to \overline{K}N$
1825±10	GOPAL	77	DPWA	$\overline{K}N$ multichannel
1825± 1	KANE	74	DPWA	$K^- p \to \Sigma\pi$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
1817 or 1818	[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.

NODE=B056M;LINKAGE=A

Λ(1830) WIDTH

NODE=B056W

NODE=B056W
→ UNCHECKED ←

VALUE (MeV)	DOCUMENT ID		TECN	COMMENT
60 to 120 (≈ 90) OUR ESTIMATE				
64± 7	SARANTSEV	19	DPWA	$\overline{K}N$ multichannel
114±10	ZHANG	13A	DPWA	Multichannel
100±10	GOPAL	80	DPWA	$\overline{K}N \to \overline{K}N$
94±10	GOPAL	77	DPWA	$\overline{K}N$ multichannel
119± 3	KANE	74	DPWA	$K^- p \to \Sigma\pi$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
56 or 56	[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.

NODE=B056W;LINKAGE=A

Λ(1830) DECAY MODES

NODE=B056215;NODE=B056

	Mode	Fraction (Γ_i/Γ)	Scale factor	
Γ_1	$N\overline{K}$	0.04 to 0.08		DESIG=1
Γ_2	$\Sigma\pi$	35–75 %		DESIG=2;OUR EST
Γ_3	ΞK			DESIG=11
Γ_4	$\Sigma(1385)\pi$	>15 %		DESIG=3;OUR EST
Γ_5	$\Sigma(1385)\pi$, D-wave	(40 ±15) %	3.2	DESIG=5
Γ_6	$\Sigma(1385)\pi$, G-wave			DESIG=12
Γ_7	$\Lambda\eta$			DESIG=4
Γ_8	$N\overline{K}^*(892)$, S=1/2, D-wave			DESIG=8
Γ_9	$N\overline{K}^*(892)$, S=3/2, D-wave			DESIG=9
Γ_{10}	$N\overline{K}^*(892)$, S=3/2, G-wave			DESIG=10

Λ(1830) BRANCHING RATIOS

NODE=B056220

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

NODE=B056220

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

NODE=B056R1
NODE=B056R1

VALUE	DOCUMENT ID		TECN	COMMENT
0.04 to 0.08 OUR ESTIMATE				
0.055±0.010	SARANTSEV	19	DPWA	$\overline{K}N$ multichannel
0.041±0.005	ZHANG	13A	DPWA	Multichannel
0.08 ±0.03	GOPAL	80	DPWA	$\overline{K}N \to \overline{K}N$
0.02 ±0.02	ALSTON-...	78	DPWA	$\overline{K}N \to \overline{K}N$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.006	[1] KAMANO	15	DPWA	Multichannel
0.04 ±0.03	GOPAL	77	DPWA	See GOPAL 80
0.04 or 0.04	[2] MARTIN	77	DPWA	$\overline{K}N$ multichannel

→ UNCHECKED ←

[1] From the preferred solution A in KAMANO 15. NODE=B056R1;LINKAGE=A

[2] The two MARTIN 77 values are from a T-matrix pole and from a Breit-Wigner fit. NODE=B056;LINKAGE=A

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

NODE=B056R00
NODE=B056R00

VALUE	DOCUMENT ID		TECN	COMMENT
0.42 ±0.08	SARANTSEV	19	DPWA	$\overline{K}N$ multichannel
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.017	[1] KAMANO	15	DPWA	Multichannel

[1] From the preferred solution A in KAMANO 15. NODE=B056R00;LINKAGE=A

$\Gamma(\Xi K)/\Gamma_{total}$ — Γ_3/Γ

NODE=B056R08
NODE=B056R08

VALUE	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.562	[1] KAMANO	15	DPWA	Multichannel

[1] From the preferred solution A in KAMANO 15. NODE=B056R08;LINKAGE=A

$\Gamma(\Sigma(1385)\pi, D\text{-wave})/\Gamma_{total}$ — Γ_5/Γ

NODE=B056R04
NODE=B056R04

VALUE	DOCUMENT ID		TECN	COMMENT
0.40 ±0.15 OUR AVERAGE Error includes scale factor of 3.2.				
0.20 ±0.08	SARANTSEV	19	DPWA	$\overline{K}N$ multichannel
0.52 ±0.06	ZHANG	13A	DPWA	Multichannel
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.134	[1] KAMANO	15	DPWA	Multichannel

[1] From the preferred solution A in KAMANO 15. NODE=B056R04;LINKAGE=A

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

NODE=B056R01
NODE=B056R01

VALUE	DOCUMENT ID		TECN	COMMENT
0.020±0.015	SARANTSEV	19	DPWA	$\overline{K}N$ multichannel

$\Gamma(\Lambda\eta)/\Gamma_{total}$ — Γ_7/Γ

NODE=B056R02
NODE=B056R02

VALUE	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.024	[1] KAMANO	15	DPWA	Multichannel

[1] From the preferred solution A in KAMANO 15. NODE=B056R02;LINKAGE=A

$\Gamma(N\overline{K}^*(892), S=1/2, D\text{-wave})/\Gamma_{total}$ — Γ_8/Γ

NODE=B056R05
NODE=B056R05

VALUE	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.134	[1] KAMANO	15	DPWA	Multichannel

OCCUR=2

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

NODE=B056R05;LINKAGE=B

$\Gamma(N\overline{K}^*(892), S=3/2, D\text{-wave})/\Gamma_{total}$ — Γ_9/Γ

NODE=B056R06
NODE=B056R06

VALUE	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.115	[1] KAMANO	15	DPWA	Multichannel

OCCUR=2

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

NODE=B056R06;LINKAGE=B

$\Gamma(N\overline{K}^*(892), S=3/2, G\text{-wave})/\Gamma_{total}$ — Γ_{10}/Γ

NODE=B056R07
NODE=B056R07

VALUE	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.009	[1] KAMANO	15	DPWA	Multichannel

OCCUR=2

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

NODE=B056R07;LINKAGE=B

$(\Gamma_i\Gamma_f)^{1/2}/\Gamma_{total}$ in $N\overline{K} \to \Lambda(1830) \to \Sigma\pi$ — $(\Gamma_1\Gamma_2)^{1/2}/\Gamma$

NODE=B056R2
NODE=B056R2

VALUE	DOCUMENT ID		TECN	COMMENT
-0.13 ± 0.01	ZHANG	13A	DPWA	Multichannel
-0.17 ± 0.03	GOPAL	77	DPWA	$\overline{K}N$ multichannel
-0.15 ± 0.01	KANE	74	DPWA	$K^- p \to \Sigma\pi$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
-0.17 or -0.17	[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.

NODE=B056R2;LINKAGE=A

$(\Gamma_i\Gamma_f)^{1/2}/\Gamma_{total}$ in $N\overline{K} \to \Lambda(1830) \to \Sigma(1385)\pi$ — $(\Gamma_1\Gamma_4)^{1/2}/\Gamma$

NODE=B056R4
NODE=B056R4

VALUE	DOCUMENT ID		TECN	COMMENT
0.20 to 0.50 OUR ESTIMATE				
$+0.141\pm0.014$	[1] CAMERON	78	DPWA	$K^- p \to \Sigma(1385)\pi$
$+0.13\pm0.03$	PREVOST	74	DPWA	$K^- N \to \Sigma(1385)\pi$

→ UNCHECKED ←

[1] The CAMERON 78 upper limit on G-wave decay is 0.03. The published sign has been changed to be in accord with the baryon-first convention.

NODE=B056;LINKAGE=C

$(\Gamma_i\Gamma_f)^{1/2}/\Gamma_{total}$ in $N\overline{K} \to \Lambda(1830) \to \Lambda\eta$ — $(\Gamma_1\Gamma_7)^{1/2}/\Gamma$

NODE=B056R3
NODE=B056R3

VALUE	DOCUMENT ID		TECN
-0.044 ± 0.020	RADER	73	MPWA

$\Lambda(1830)$ REFERENCES

NODE=B056

SARANTSEV	19	EPJ A55 180	A.V. Sarantsev *et al.*	(BONN, PNPI)	REFID=59986
KAMANO	15	PR C92 025205	H. Kamano *et al.*	(ANL, OSAK)	REFID=57507
ZHANG	13A	PR C88 035205	H. Zhang *et al.*	(KSU)	REFID=55441
PDG	82	PL 111B 1	M. Roos *et al.*	(HELS, CIT, CERN)	REFID=41167
GOPAL	80	Toronto Conf. 159	G.P. Gopal	(RHEL) IJP	REFID=31755
ALSTON-...	78	PR D18 182	M. Alston-Garnjost *et al.*	(LBL, MTHO+) IJP	REFID=31751
Also		PRL 38 1007	M. Alston-Garnjost *et al.*	(LBL, MTHO+) IJP	REFID=31752
CAMERON	78	NP B143 189	W. Cameron *et al.*	(RHEL, LOIC) IJP	REFID=31837
GOPAL	77	NP B119 362	G.P. Gopal *et al.*	(LOIC, RHEL) IJP	REFID=31750
MARTIN	77	NP B127 349	B.R. Martin, M.K. Pidcock, R.G. Moorhouse	(LOUC+) IJP	REFID=31762
Also		NP B126 266	B.R. Martin, M.K. Pidcock	(LOUC)	REFID=31763
Also		NP B126 285	B.R. Martin, M.K. Pidcock	(LOUC) IJP	REFID=31764
KANE	74	LBL-2452	D.F. Kane	(LBL) IJP	REFID=31759
PREVOST	74	NP B69 246	J. Prevost *et al.*	(SACL, CERN, HEID)	REFID=31785
RADER	73	NC 16A 178	R.K. Rader *et al.*	(SACL, HEID, CERN+)	REFID=31882