NODE=B040

$\Lambda(1670)$ $1/2^-$

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

NODE=B040

The measurements of the mass, width, and elasticity published before 1974 are now obsolete and have been omitted. They were last listed in our 1982 edition Physics Letters **111B** 1 (1982).

NODE=B040

$\Lambda(1670)$ POLE POSITIONS

NODE=B040225

REAL PART

NODE=B040RE
NODE=B040RE

VALUE (MeV)	*DOCUMENT ID*		*TECN*	*COMMENT*
1670 to 1678 (≈ 1674) OUR ESTIMATE				
1676 ±2	SARANTSEV	19	DPWA	$\overline{K}N$ multichannel
1669 $^{+3}_{-8}$	[1] KAMANO	15	DPWA	$\overline{K}N$ multichannel
1677.5±0.8	GARCIA-REC...	03	DPWA	$\overline{K}N$ multichannel
• • • We do not use the following data for averages, fits, limits, etc. • • •				
1667	ZHANG	13A	DPWA	$\overline{K}N$ multichannel

→ UNCHECKED ←

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

NODE=B040RE;LINKAGE=A

−2×IMAGINARY PART

NODE=B040IM
NODE=B040IM

VALUE (MeV)	*DOCUMENT ID*		*TECN*	*COMMENT*
28 to 36 (≈ 32) OUR ESTIMATE				
33 ± 4	SARANTSEV	19	DPWA	$\overline{K}N$ multichannel
19 $^{+18}_{-2}$	[1] KAMANO	15	DPWA	$\overline{K}N$ multichannel
29.2± 1.4	GARCIA-REC...	03	DPWA	$\overline{K}N$ multichannel
• • • We do not use the following data for averages, fits, limits, etc. • • •				
26	ZHANG	13A	DPWA	$\overline{K}N$ multichannel

→ UNCHECKED ←

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

NODE=B040IM;LINKAGE=A

$\Lambda(1670)$ POLE RESIDUES

NODE=B040250

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

NODE=B040250

Normalized residue in $\overline{K}N \to \Lambda(1670) \to \overline{K}N$

NODE=B040A00
NODE=B040A00

MODULUS	*PHASE* (°)	*DOCUMENT ID*		*TECN*	*COMMENT*
0.30 ±0.06	**−145 ± 11**	SARANTSEV	19	DPWA	$\overline{K}N$ multichannel
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.351	164	[1] KAMANO	15	DPWA	$\overline{K}N$ multichannel

OCCUR=2

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

NODE=B040A00;LINKAGE=A

Normalized residue in $N\overline{K} \to \Lambda(1670) \to \Sigma\pi$

NODE=B040A01
NODE=B040A01

MODULUS	*PHASE* (°)	*DOCUMENT ID*		*TECN*	*COMMENT*
0.19 ±0.06	**145 ± 14**	SARANTSEV	19	DPWA	$\overline{K}N$ multichannel
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.327	125	[1] KAMANO	15	DPWA	$\overline{K}N$ multichannel

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

NODE=B040A01;LINKAGE=A

Normalized residue in $N\overline{K} \to \Lambda(1670) \to \Lambda\eta$

NODE=B040A02
NODE=B040A02

MODULUS	*PHASE* (°)	*DOCUMENT ID*		*TECN*	*COMMENT*
0.26 ±0.09	**104 ± 14**	SARANTSEV	19	DPWA	$\overline{K}N$ multichannel
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.474	59	[1] KAMANO	15	DPWA	Multichannel

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

NODE=B040A02;LINKAGE=A

Normalized residue in $N\overline{K} \to \Lambda(1670) \to \Xi K$

NODE=B040A03
NODE=B040A03

MODULUS	*PHASE* (°)	*DOCUMENT ID*		*TECN*	*COMMENT*
0.02±0.02	**100 ± 25**	SARANTSEV	19	DPWA	$\overline{K}N$ multichannel

Normalized residue in $N\overline{K} \to \Lambda(1670) \to \Lambda\omega$, S=1/2, S-wave

NODE=B040A08
NODE=B040A08

MODULUS	*PHASE* (°)	*DOCUMENT ID*		*TECN*	*COMMENT*
0.09±0.04	**−60 ± 35**	SARANTSEV	19	DPWA	$\overline{K}N$ multichannel

Normalized residue in $N\overline{K} \to \Lambda(1670) \to \Lambda\omega$, S=3/2, D-wave

NODE=B040A09
NODE=B040A09

MODULUS	PHASE (°)	DOCUMENT ID		TECN	COMMENT
0.05±0.04		SARANTSEV	19	DPWA	$\overline{K}N$ multichannel

Normalized residue in $N\overline{K} \to \Lambda(1670) \to N\overline{K}^*(892)$, S=1/2, S-wave

NODE=B040A06
NODE=B040A06

MODULUS	PHASE (°)	DOCUMENT ID		TECN	COMMENT
0.31±0.14	**100 ± 45**	SARANTSEV	19	DPWA	$\overline{K}N$ multichannel

Normalized residue in $N\overline{K} \to \Lambda(1670) \to N\overline{K}^*(892)$, S=3/2, D-wave

NODE=B040A07
NODE=B040A07

MODULUS	PHASE (°)	DOCUMENT ID		TECN	COMMENT
0.06±0.03	**−85 ± 40**	SARANTSEV	19	DPWA	$\overline{K}N$ multichannel

Normalized residue in $N\overline{K} \to \Lambda(1670) \to \Lambda\sigma$

NODE=B040A05
NODE=B040A05

MODULUS	PHASE (°)	DOCUMENT ID		TECN	COMMENT
0.25±0.08	**160 ± 15**	SARANTSEV	19	DPWA	$\overline{K}N$ multichannel

Normalized residue in $N\overline{K} \to \Lambda(1670) \to \Sigma(1385)\pi$

NODE=B040A04
NODE=B040A04

MODULUS	PHASE (°)	DOCUMENT ID		TECN	COMMENT
0.13 ±0.06	**110 ± 12**	SARANTSEV	19	DPWA	$\overline{K}N$ multichannel
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.0988	−104	[1] KAMANO	15	DPWA	Multichannel

OCCUR=2

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

NODE=B040A04;LINKAGE=A

Λ(1670) MASS

NODE=B040M

NODE=B040M
→ UNCHECKED ←

VALUE (MeV)	DOCUMENT ID		TECN	COMMENT
1670 to 1678 (≈ 1674) OUR ESTIMATE				
1667.5±2.3±3.6	ABLIKIM	25AF	BES3	$\psi(3686) \to \Lambda\overline{\Sigma}^0\pi^0$ + c.c. (PWA)
1674.3±0.8±4.9	LEE	21A	BELL	$\Lambda_c^+ \to \Lambda(1670)\pi^+$
1677 ±2	SARANTSEV	19	DPWA	$\overline{K}N$ multichannel
1672 ±3	ZHANG	13A	DPWA	Multichannel
1670.8±1.7	KOISO	85	DPWA	$K^- p \to \Sigma\pi$
1667 ±5	GOPAL	80	DPWA	$\overline{K}N \to \overline{K}N$
1671 ±3	ALSTON-...	78	DPWA	$\overline{K}N \to \overline{K}N$
1675 ±2	HEPP	76B	DPWA	$K^- N \to \Sigma\pi$
1679 ±1	KANE	74	DPWA	$K^- p \to \Sigma\pi$
1665 ±5	PREVOST	74	DPWA	$K^- N \to \Sigma(1385)\pi$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
1673 ±2	MANLEY	02	DPWA	$\overline{K}N$ multichannel
1668.9±2.0	ABAEV	96	DPWA	$K^- p \to \Lambda\eta$
1670 ±5	GOPAL	77	DPWA	$\overline{K}N$ multichannel
1664	[1] MARTIN	77	DPWA	$\overline{K}N$ multichannel

[1] MARTIN 77 obtains identical resonance parameters from a T-matrix pole and from a Breit-Wigner fit.

NODE=B040M;LINKAGE=A

Λ(1670) WIDTH

NODE=B040W

NODE=B040W
→ UNCHECKED ←

VALUE (MeV)	DOCUMENT ID		TECN	COMMENT
25 to 35 (≈ 30) OUR ESTIMATE				
30.2± 4.2±8.7	ABLIKIM	25AF	BES3	$\psi(3686) \to \Lambda\overline{\Sigma}^0\pi^0$ + c.c. (PWA)
36.1± 2.4±4.8	LEE	21A	BELL	$\Lambda_c^+ \to \Lambda(1670)\pi^+$
33 ± 4	SARANTSEV	19	DPWA	$\overline{K}N$ multichannel
29 ± 5	ZHANG	13A	DPWA	$\overline{K}N$ multichannel
34.1± 3.7	KOISO	85	DPWA	$K^- p \to \Sigma\pi$
29 ± 5	GOPAL	80	DPWA	$\overline{K}N \to \overline{K}N$
29 ± 5	ALSTON-...	78	DPWA	$\overline{K}N \to \overline{K}N$
46 ± 5	HEPP	76B	DPWA	$K^- N \to \Sigma\pi$
40 ± 3	KANE	74	DPWA	$K^- p \to \Sigma\pi$
19 ± 5	PREVOST	74	DPWA	$K^- N \to \Sigma(1385)\pi$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
23 ± 6	MANLEY	02	DPWA	$\overline{K}N$ multichannel
21.1± 3.6	ABAEV	96	DPWA	$K^- p \to \Lambda\eta$
45 ±10	GOPAL	77	DPWA	$\overline{K}N$ multichannel
12	[1] MARTIN	77	DPWA	$\overline{K}N$ multichannel

[1] MARTIN 77 obtains identical resonance parameters from a T-matrix pole and from a Breit-Wigner fit.

NODE=B040W;LINKAGE=A

$\Lambda(1670)$ DECAY MODES

NODE=B040215;NODE=B040

	Mode	Fraction (Γ_i/Γ)	
Γ_1	$N\overline{K}$	20–30 %	DESIG=1;OUR EST
Γ_2	$\Sigma\pi$	25–55 %	DESIG=3;OUR EST
Γ_3	$\Lambda\eta$	10–25 %	DESIG=2;OUR EST
Γ_4	$\Sigma(1385)\pi$, D-wave	(6.0±2.0) %	DESIG=4
Γ_5	$N\overline{K}^*(892)$, S=1/2, S-wave		DESIG=6
Γ_6	$N\overline{K}^*(892)$, S=3/2, D-wave	(5 ±4) %	DESIG=5
Γ_7	$\Lambda\sigma$	(20 ±8) %	DESIG=10

$\Lambda(1670)$ BRANCHING RATIOS

NODE=B040220

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

NODE=B040220

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

NODE=B040R1
NODE=B040R1

VALUE	DOCUMENT ID		TECN	COMMENT
0.20 to 0.30 OUR ESTIMATE				
0.33 ±0.07	SARANTSEV	19	DPWA	$\overline{K}N$ multichannel
0.26 ±0.25	ZHANG	13A	DPWA	$\overline{K}N$ multichannel
0.18 ±0.03	GOPAL	80	DPWA	$\overline{K}N \to \overline{K}N$
0.17 ±0.03	ALSTON-...	78	DPWA	$\overline{K}N \to \overline{K}N$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.318	[1] KAMANO	15	DPWA	$\overline{K}N$ multichannel
0.37 ±0.07	MANLEY	02	DPWA	$\overline{K}N$ multichannel
0.20 ±0.03	GOPAL	77	DPWA	See GOPAL 80
0.15	[2] MARTIN	77	DPWA	$\overline{K}N$ multichannel

→ UNCHECKED ←

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

NODE=B040R1;LINKAGE=A

[2] MARTIN 77 obtains identical resonance parameters from a T-matrix pole and from a Breit-Wigner fit.

NODE=B040;LINKAGE=A

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

NODE=B040R5
NODE=B040R5

VALUE	DOCUMENT ID		TECN	COMMENT
0.12 ±0.03	SARANTSEV	19	DPWA	$\overline{K}N$ multichannel
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.289	[1] KAMANO	15	DPWA	Multichannel

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

NODE=B040R5;LINKAGE=A

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

NODE=B040R8
NODE=B040R8

VALUE	DOCUMENT ID		TECN	COMMENT
0.20 ±0.08	SARANTSEV	19	DPWA	$\overline{K}N$ multichannel
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.373	KAMANO	15	DPWA	Multichannel
0.30 ±0.08	ABAEV	96	DPWA	$K^- p \to \Lambda\eta$

OCCUR=3

$\Gamma(\Sigma(1385)\pi, D\text{-wave})/\Gamma_{total}$ — Γ_4/Γ

NODE=B040R01
NODE=B040R01

VALUE	DOCUMENT ID		TECN	COMMENT
0.06 ±0.02	SARANTSEV	19	DPWA	$\overline{K}N$ multichannel
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.019	KAMANO	15	DPWA	Multi-channel

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

NODE=B040R02
NODE=B040R02

VALUE	DOCUMENT ID		TECN	COMMENT
0.20±0.08	SARANTSEV	19	DPWA	$\overline{K}N$ multichannel

$\Gamma(N\overline{K}^*(892), S\text{=1/2}, S\text{-wave})/\Gamma_{total}$ — Γ_5/Γ

NODE=B040R00
NODE=B040R00

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

[1] Not seen in the preferred solution A in KAMANO 15.

NODE=B040R00;LINKAGE=A

$\Gamma(N\overline{K}^*(892), S=3/2, D\text{-wave})/\Gamma_{total}$ — Γ_6/Γ

NODE=B040R05
NODE=B040R05

VALUE	DOCUMENT ID		TECN	COMMENT
0.05±0.04	ZHANG	13A	DPWA	Multichannel
• • • We do not use the following data for averages, fits, limits, etc. • • •				
not seen	[1] KAMANO	15	DPWA	Multichannel

[1] Not seen in the preferred solution A in KAMANO 15.

NODE=B040R05;LINKAGE=A

$(\Gamma_i\Gamma_f)^{1/2}/\Gamma_{total}$ in $N\overline{K} \to \Lambda(1670) \to \Sigma\pi$ — $(\Gamma_1\Gamma_2)^{1/2}/\Gamma$

NODE=B040R3
NODE=B040R3

VALUE	DOCUMENT ID		TECN	COMMENT
−0.29±0.06	ZHANG	13A	DPWA	Multichannel
−0.26±0.02	KOISO	85	DPWA	$K^- p \to \Sigma\pi$
−0.31±0.03	GOPAL	77	DPWA	$\overline{K}N$ multichannel
−0.29±0.03	HEPP	76B	DPWA	$K^- N \to \Sigma\pi$
−0.23±0.03	LONDON	75	HLBC	$K^- p \to \Sigma^0\pi^0$
−0.27±0.02	KANE	74	DPWA	$K^- p \to \Sigma\pi$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
−0.38±0.03	MANLEY	02	DPWA	$\overline{K}N$ multichannel
−0.13	[1] MARTIN	77	DPWA	$\overline{K}N$ multichannel

[1] MARTIN 77 obtains identical resonance parameters from a T-matrix pole and from a Breit-Wigner fit.

NODE=B040R3;LINKAGE=A

$(\Gamma_i\Gamma_f)^{1/2}/\Gamma_{total}$ in $N\overline{K} \to \Lambda(1670) \to \Lambda\eta$ — $(\Gamma_1\Gamma_3)^{1/2}/\Gamma$

NODE=B040R2
NODE=B040R2

VALUE	DOCUMENT ID		TECN	COMMENT
−0.30±0.10	ZHANG	13A	DPWA	Multichannel
+0.20±0.05	BAXTER	73	DPWA	$K^- p \to$ neutrals
• • • We do not use the following data for averages, fits, limits, etc. • • •				
+0.24±0.04	MANLEY	02	DPWA	$\overline{K}N$ multichannel
0.24	KIM	71	DPWA	K-matrix analysis
0.26	ARMENTEROS	69C	HBC	
0.20 or 0.23	BERLEY	65	HBC	

$(\Gamma_i\Gamma_f)^{1/2}/\Gamma_{total}$ in $N\overline{K} \to \Lambda(1670) \to \Sigma(1385)\pi$, D-wave — $(\Gamma_1\Gamma_4)^{1/2}/\Gamma$

NODE=B040R4
NODE=B040R4

VALUE	DOCUMENT ID		TECN	COMMENT
−0.17±0.06	MANLEY	02	DPWA	$\overline{K}N$ multichannel
−0.18±0.05	PREVOST	74	DPWA	$K^- N \to \Sigma(1385)\pi$

$\Lambda(1670)$ REFERENCES

NODE=B040

ABLIKIM	25AF	JHEP 2502 212	M. Ablikim *et al.*	(BESIII Collab.)	REFID=63277
LEE	21A	PR D103 052005	J.Y. Lee *et al.*	(BELLE Collab.)	REFID=61110
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
GARCIA-REC...	03	PR D67 076009	C. Garcia-Recio *et al.*	(GRAN, VALE)	REFID=49349
MANLEY	02	PRL 88 012002	D.M. Manley *et al.*	(BNL Crystal Ball Collab.)	REFID=48517
ABAEV	96	PR C53 385	V.V. Abaev, B.M.K. Nefkens	(UCLA)	REFID=44674
KOISO	85	NP A433 619	H. Koiso *et al.*	(TOKY, MASA)	REFID=31795
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
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
HEPP	76B	PL 65B 487	V. Hepp *et al.*	(CERN, HEIDH, MPIM) IJP	REFID=31761
LONDON	75	NP B85 289	G.W. London *et al.*	(BNL, CERN, EPOL+)	REFID=31786
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
BAXTER	73	NP B67 125	D.F. Baxter *et al.*	(OXF) IJP	REFID=31782
KIM	71	PRL 27 356	J.K. Kim	(HARV) IJP	REFID=31740
Also		Duke Conf. 161	J.K. Kim	(HARV) IJP	REFID=31741
Hyperon Resonances, 1970					
ARMENTEROS	69C	Lund Paper 229	R. Armenteros *et al.*	(CERN, HEID, SACL) IJP	REFID=31773
Values are quoted in LEVI-SETTI 69.					
BERLEY	65	PRL 15 641	D. Berley *et al.*	(BNL) IJP	REFID=31769