Λ(1670) 1/2[—]

$$I(J^P) = O(\frac{1}{2})$$
 Status: ***

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 $\bf 111B$ 1 (1982).

Λ(1670) POLE POSITIONS

R EAL PART ALUE (MeV)		DOCUMENT ID	·	TECN	COMMENT
669 ⁺³		¹ KAMANO	15	DPWA	Multichannel
• • We do	not use the follow	ing data for averag	es, fits,	limits, e	etc. • • •
567		ZHANG	13A	DPWA	Multichannel
1 From the	preferred solution	A in KAMANO 15			
2×IMAGI	NARY PART				
ALUE (MeV)		DOCUMENT ID	DOCUMENT ID		COMMENT
9 ⁺¹⁸		$^{ m 1}$ KAMANO	15	DPWA	Multichannel
• • We do	not use the follow	ing data for averag	es, fits,	limits, e	etc. • • •
5		ZHANG	13A	DPWA	Multichannel
$^{ m 1}$ From the	preferred solution	A in KAMANO 15	_		
ormalized	residue in \overline{K} N		ded by KN	Γ _{pole} /2.	N <u>COMMENT</u>
ormalized ODULUS • • We do	residue in $\overline{K}N$ PHASE (°) not use the follow 164	e is the residue divide $\rightarrow \Lambda(1670) \rightarrow$	KN FID es, fits,	$\Gamma_{pole}/2$. TECH limits, 6	N <u>COMMENT</u>
lormalized ODULUS • • We do 351 ¹ From the	residue in $\overline{K}N$ PHASE (°) not use the follow 164 preferred solution residue in $N\overline{K}$	e is the residue divided to the interest of the residue divided to the interest of the intere	ded by $\overline{K}N$ r	Γ _{pole} /2	N <u>COMMENT</u> etc. • • • NA Multichanne
ormalized ODULUS • • We do 351 1 From the ormalized ODULUS	residue in \overline{K} N PHASE (°) not use the follow 164 preferred solution residue in $N\overline{K}$ PHASE (°)	e is the residue divided to the interest of the residue divided to the interest of the intere	TID Es, fits, Σπ TID	Γ _{pole} /2	N COMMENT NA Multichanne N COMMENT
ormalized ODULUS • • We do 351 ¹ From the ormalized ODULUS • • We do	residue in \overline{K} N PHASE (°) not use the follow 164 preferred solution residue in $N\overline{K}$ PHASE (°) not use the follow	e is the residue divided to the control of the cont	ded by $\overline{K}N$ $\overline{K}N$ es, fits, $\Sigma \pi$ $\overline{L}D$ es, fits,	Γ _{pole} /2. <u>TEC</u> limits, ε 5 DP\ <u>TEC</u> limits, ε	N COMMENT NA Multichanne N COMMENT etc. • • •
ormalized ODULUS • • We do a 351 1 From the a ODULUS • • We do a 327	residue in $\overline{K}N$ PHASE (°) not use the follow 164 preferred solution residue in $N\overline{K}$ PHASE (°) not use the follow 125	e is the residue divided to the image of the residue divided to the image of the im	TID Es, fits, Σπ TID es, fits, 1	Γ _{pole} /2. <u>TEC</u> limits, ε 5 DP\ <u>TEC</u> limits, ε	N COMMENT NA Multichanne N COMMENT
lormalized ODULUS • • We do 351 1 From the CODULUS • • We do 327	residue in $\overline{K}N$ PHASE (°) not use the follow 164 preferred solution residue in $N\overline{K}$ PHASE (°) not use the follow 125	e is the residue divided to the control of the cont	TID Es, fits, Σπ TID es, fits, 1	Γ _{pole} /2. <u>TEC</u> limits, ε 5 DP\ <u>TEC</u> limits, ε	N COMMENT NA Multichanne N COMMENT etc. • • •
lormalized ODULUS • • We do a 351 ¹ From the a lormalized ODULUS • • We do a 327 ¹ From the a lormalized lormalized	residue in \overline{K} N PHASE (°) not use the follow 164 preferred solution residue in $N\overline{K}$ PHASE (°) not use the follow 125 preferred solution residue in $N\overline{K}$	e is the residue divided to the image of the residue divided to the image of the i	FID Sπ FID es, fits, Σπ FID es, fits, 1	Γ _{pole} /2. <u>TEC</u> limits, ε 5 DP\ <u>TEC</u> limits, ε	N COMMENT NA Multichanne N COMMENT etc. • • •
lormalized ODULUS • • We do 351 ¹ From the lormalized ODULUS • • We do 327 ¹ From the lormalized ODULUS	residue in \overline{K} N PHASE (°) not use the follow 164 preferred solution residue in $N\overline{K}$ PHASE (°) not use the follow 125 preferred solution residue in $N\overline{K}$ PHASE (°)	e is the residue divided to the image of the residue divided to the image of the i	FID Es, fits, TID Es, fits, TID Es, fits, TID TID TID	Γ _{pole} /2. TECH limits, 6 5 DPN TECH limits, 6 5 DPN	N COMMENT NA Multichanne N COMMENT etc. • • • NA Multichanne
lormalized ODULUS • • We do 351 ¹ From the lormalized ODULUS • • We do 327 ¹ From the lormalized ODULUS	residue in \overline{K} N PHASE (°) not use the follow 164 preferred solution residue in $N\overline{K}$ PHASE (°) not use the follow 125 preferred solution residue in $N\overline{K}$ PHASE (°)	e is the residue divided to the image of the residue divided to the image of the i	TID es, fits, 1 Σπ TID es, fits, 1 Λη TID es, fits,	TECH limits, e 5 DPV TECH limits, e 5 DPV	N COMMENT NA Multichanne N COMMENT etc. • • • NA Multichanne

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

 MODULUS
 PHASE (°)
 DOCUMENT ID
 TECN
 COMMENT

 • • • We do not use the following data for averages, fits, limits, etc.
 • • •

 0.0988
 −104
 1 KAMANO
 15
 DPWA
 Multichannel

 1 From the preferred solution A in KAMANO
 15.

Λ(1670) MASS

VALUE (MeV)	DOCUMENT ID		TECN	COMMENT
1660 to 1680 (≈ 1670) OUR ES	TIMATE			
1672 ± 3	ZHANG	_		Multichannel
1677.5 ± 0.8	¹ GARCIA-REC.	03	DPWA	$\overline{K}N$ multichannel
1673 ± 2	MANLEY	02	DPWA	$\overline{K}N$ multichannel
1670.8 ± 1.7	KOISO	85	DPWA	$K^- p \rightarrow \Sigma \pi$
1667 ± 5	GOPAL	80	DPWA	$\overline{K} N \rightarrow \overline{K} N$
1671 ± 3	ALSTON	78	DPWA	$\overline{K} N \rightarrow \overline{K} N$
1670 ± 5	GOPAL	77	DPWA	$\overline{K}N$ multichannel
1675 ± 2	HEPP	76 B	DPWA	$K^- N \rightarrow \Sigma \pi$
1679 ± 1	KANE	74	DPWA	$K^- p \rightarrow \Sigma \pi$
1665 ± 5	PREVOST	74	DPWA	$K^- N \rightarrow \Sigma(1385) \pi$
• • • We do not use the following	data for average	s, fits,	limits, e	etc. • •
1668.9 ± 2.0	ABAEV	96	DPWA	$K^- p \rightarrow \Lambda \eta$
1664	² MARTIN	77	DPWA	$\overline{K}N$ multichannel

 $^{^{1}}$ GARCIA-RECIO 03 gives pole, not Breit-Wigner, parameters, but the narrow width of the $\Lambda(1670)$ means there will be little difference.

Λ(1670) WIDTH

VALUE (MeV)	DOCUMENT ID		TECN COMMENT
25 to 50 (≈ 35) OUR ESTIMATI			
29 ± 5	ZHANG		DPWA Multichannel
29.2± 1.4	¹ GARCIA-REC.	03	DPWA $\overline{K}N$ multichannel
23 ± 6	MANLEY	02	DPWA $\overline{K}N$ multichannel
34.1± 3.7	KOISO	85	DPWA $K^-p \rightarrow \Sigma \pi$
29 ± 5	GOPAL	80	DPWA $\overline{K}N \rightarrow \overline{K}N$
29 ± 5	ALSTON	78	DPWA $\overline{K}N \rightarrow \overline{K}N$
45 ± 10	GOPAL	77	DPWA $\overline{K}N$ multichannel
46 ± 5	HEPP	76 B	DPWA $K^- N \rightarrow \Sigma \pi$
40 ± 3	KANE	74	DPWA $K^-p \rightarrow \Sigma \pi$
19 ± 5	PREVOST	74	DPWA $K^- N \rightarrow \Sigma(1385) \pi$
ullet $ullet$ We do not use the following	data for averages	s, fits,	limits, etc. • • •
21.1± 3.6	ABAEV	96	DPWA $K^-p \rightarrow \Lambda \eta$
12	² MARTIN	77	DPWA $\overline{K}N$ multichannel

 $^{^{1}}$ GARCIA-RECIO 03 gives pole, not Breit-Wigner, parameters, but the narrow width of the $\Lambda(1670)$ means there will be little difference.

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

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

Λ(1670) DECAY MODES

	Mode	Fraction (Γ_i/Γ)
$\overline{\Gamma_1}$	NK	20–30 %
Γ_2	$\Sigma \pi$	25–55 %
Γ_3	$\Lambda\eta$	10–25 %
	$\Sigma(1385)\pi$, $ extit{D}$ -wave	
	$N\overline{K}^*(892)$, $S=1/2$, S -wave	
Γ ₆	$N\overline{K}^*$ (892), $S=3/2$, D -wave	(5±4) %

Λ(1670) BRANCHING RATIOS

See "Sign conventions for resonance couplings" in the Note on \varLambda and \varSigma Resonances.

$\Gamma(N\overline{K})/\Gamma_{total}$					Γ_1/Γ
VALUE	DOCUMENT ID		TECN	COMMENT	
0.20 to 0.30 OUR ESTIMATE					
0.26 ± 0.25	ZHANG	13A		Multichannel	
0.37 ± 0.07	MANLEY	02		$\overline{K}N$ multichanne	
0.18 ± 0.03	GOPAL	80		$\overline{K}N \rightarrow \overline{K}N$	
0.17 ± 0.03	ALSTON	78	DPWA	$\overline{K}N \rightarrow \overline{K}N$	
• • • We do not use the following	data for average	s, fits,	limits, e	etc. • • •	
0.318	¹ KAMANO	15	DPWA	Multichannel	
0.20 ± 0.03	GOPAL	77	DPWA	See GOPAL 80	
0.15	² MARTIN	77	DPWA	$\overline{K}N$ multichanne	1
¹ From the preferred solution A in ² MARTIN 77 obtains identical in Breit-Wigner fit.		eters	from a T	Γ-matrix pole and	from a
$\Gamma(\Sigma\pi)/\Gamma_{\text{total}}$	DOCUMENT ID		TECN	COMMENT	Γ_2/Γ
VALUE	DOCUMENT ID	· · ·		<u>COMMENT</u>	
• • • We do not use the following					
0.289	¹ KAMANO	15	DPWA	Multichannel	
$^{\mathrm{1}}$ From the preferred solution A i	n 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. • • 					
0.373	KAMANO	15	DPWA	Multichannel	
0.30 ± 0.08	ABAEV	96	DPWA	$K^- p \rightarrow \Lambda \eta$	
$\Gamma(\Sigma(1385)\pi$, <i>D</i> -wave $)/\Gamma_{total}$					Γ_4/Γ
VALUE	DOCUMENT ID			COMMENT	
• • • We do not use the following	data for average	s, fits,	limits, e	etc. • • •	
0.019	KAMANO	15	DWPA	Multi-channel	

$\Gamma(N\overline{K}^*(892), S=1/2)$	-			Г ₅ /Г
<u>VALUE</u>	DOCUMENT ID			
• • • vve do not use the	e following data for averages			
not seen	¹ KAMANO		DPWA	Multichannel
¹ Not seen in the prefe	erred solution A in KAMAN	O 15.		
$\Gamma(N\overline{K}^*(892), S=3/2)$	$(2, D-wave)/\Gamma_{total}$			Γ ₆ /Γ
VALUE	DOCUMENT ID		TECN	COMMENT
0.05 ± 0.04	ZHANG	13A	DPWA	Multichannel
• • • We do not use the	e following data for averages	s, fits,	limits, e	etc. • • •
not seen	$^{ m 1}$ KAMANO	15	DPWA	Multichannel
$^{ m 1}$ Not seen in the prefe	erred solution A in KAMAN	O 15.		
16 _	-			· 1/2 ·-
$(\Gamma_i \Gamma_f)^{\frac{1}{2}} / \Gamma_{\text{total}} \text{ in } N\overline{I}$	` '		TECN	$(\Gamma_1\Gamma_2)^{\frac{1}{2}}/\Gamma$
<i>VALUE</i> -0.29±0.06	<u>DOCUMENT ID</u> ZHANG	124		<u>COMMENT</u> Multichannel
-0.29 ± 0.00 -0.38 ± 0.03	MANLEY			$\overline{K}N$ multichannel
-0.26 ± 0.02	KOISO			$K^- p \rightarrow \Sigma \pi$
-0.31 ± 0.03	GOPAL	77		$\frac{K}{K}N$ multichannel
-0.29 ± 0.03	HEPP			$K^- N \rightarrow \Sigma \pi$
-0.23 ± 0.03	LONDON			$K^- p \rightarrow \Sigma^0 \pi^0$
-0.27 ± 0.02	KANE	74		$K^-p \rightarrow \Sigma \pi$
	e following data for averages	s, fits,		•
-0.13	¹ MARTIN	77		$\overline{K}N$ multichannel
¹ MARTIN 77 obtains Breit-Wigner fit.	s identical resonance parame	eters	from a T	-matrix pole and from
$(\Gamma_i \Gamma_f)^{\frac{1}{2}} / \Gamma_{\text{total}} \text{ in } N^{\frac{1}{2}}$	$\overline{K} \rightarrow \Lambda(1670) \rightarrow \Lambda \eta$ DOCUMENT ID		TECN	$(\Gamma_1\Gamma_3)^{\frac{1}{2}}/\Gamma_3$
-0.30 ± 0.10	ZHANG			Multichannel
$+0.24\pm0.04$	MANLEY	02		$\overline{K}N$ multichannel
$+0.20\pm0.05$	BAXTER	73		$K^-p \rightarrow \text{neutrals}$
	e following data for averages			· · · · · · · · · · · · · · · · · · ·
0.24	KIM			K-matrix analysis
0.24	ARMENTERO			it matrix analysis
0.20 or 0.23	BERLEY	65		
$(\Gamma_i \Gamma_f)^{\frac{1}{2}} / \Gamma_{\text{total}} \text{ in } N\overline{I}$	$\overline{K} \rightarrow \Lambda(1670) \rightarrow \Sigma(1385)$	5)π,	<i>D</i> -wave	e (Γ ₁ Γ ₄) ^½ /Γ
VALUE	DOCUMENT ID	•		
$-0.17\!\pm\!0.06$	MANLEY	02	DPWA	$\overline{K}N$ multichannel

 $-0.18 \!\pm\! 0.05$

PREVOST

74 DPWA $K^-N \rightarrow \Sigma(1385)\pi$

Λ(1670) REFERENCES

-	15 13A	PR C92 025205 PR C88 035205	H. Kamano <i>et al.</i> H. Zhang <i>et al.</i>	(ANL, OSAK) (KSU)		
GARCIA-REC 0)3	PR D67 076009	C. Garcia-Recio <i>et al.</i>	(GRAN, VALE)		
MANLEY 0)2	PRL 88 012002	D.M. Manley et al.	(BNL Crystal Ball Collab.)		
ABAEV 9	96	PR C53 385	V.V. Abaev, B.M.K. Nefkens	(UCLA)		
KOISO 8	35	NP A433 619	H. Koiso <i>et al.</i>	(TOKY, MASA)		
PDG 8	32	PL 111B 1	M. Roos et al.	(HELS, CIT, CERN)		
GOPAL 8	30	Toronto Conf. 159	G.P. Gopal	(RHEL) IJP		
ALSTON 7	78	PR D18 182	M. Alston-Garnjost et al.	(LBL, MTHO+) IJP		
Also		PRL 38 1007	M. Alston-Garnjost et al.	(LBL, MTHO+) IJP		
GOPAL 7	77	NP B119 362	G.P. Gopal <i>et al.</i>	(LOIC, RHEL) IJP		
MARTIN 7	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		
HEPP 7	76B	PL 65B 487	V. Hepp <i>et al.</i>	(CERN, HEIDH, MPIM) IJP		
LONDON 7.	75	NP B85 289	G.W. London et al.	(BNL, CERN, EPOL+)		
KANE 7	74	LBL-2452	D.F. Kane	(LBL) IJP		
PREVOST 7	74	NP B69 246	J. Prevost <i>et al.</i>	(SACL, CERN, HEID)		
BAXTER 7	73	NP B67 125	D.F. Baxter et al.	(OXF) IJP		
KIM 7	71	PRL 27 356	J.K. Kim	(HARV) IJP		
Also		Duke Conf. 161	J.K. Kim	(HARV) IJP		
Hyperon Resonances, 1970						
ARMENTEROS 6			R. Armenteros <i>et al.</i>	(CERN, HEID, SACL) IJP		
		in LEVI-SETTI 69.		/		
BERLEY 6	55	PRL 15 641	D. Berley <i>et al.</i>	(BNL) IJP		