NODE=B040

$\Lambda(1670)$ S_{01}

$I(J^P) = 0(\frac{1}{2}^-)$ 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 **111B** 1 (1982).

NODE=B040

$\Lambda(1670)$ MASS

NODE=B040205

NODE=B040M

→ NOT CHECKED ←

VALUE (MeV)	*DOCUMENT ID*		*TECN*	*COMMENT*
1660 to 1680 (≈ 1670) OUR ESTIMATE				
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	$K^- p \to \Sigma\pi$
1667 ±5	GOPAL	80	DPWA	$\overline{K}N \to \overline{K}N$
1671 ±3	ALSTON-...	78	DPWA	$\overline{K}N \to \overline{K}N$
1670 ±5	GOPAL	77	DPWA	$\overline{K}N$ multichannel
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. • • •				
1668.9±2.0	ABAEV	96	DPWA	$K^- p \to \Lambda\eta$
1664	[2] MARTIN	77	DPWA	$\overline{K}N$ multichannel

$\Lambda(1670)$ WIDTH

NODE=B040210

NODE=B040W

→ NOT CHECKED ←

VALUE (MeV)	*DOCUMENT ID*		*TECN*	*COMMENT*
25 to 50 (≈ 35) OUR ESTIMATE				
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	$K^- p \to \Sigma\pi$
29 ± 5	GOPAL	80	DPWA	$\overline{K}N \to \overline{K}N$
29 ± 5	ALSTON-...	78	DPWA	$\overline{K}N \to \overline{K}N$
45 ±10	GOPAL	77	DPWA	$\overline{K}N$ multichannel
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. • • •				
21.1± 3.6	ABAEV	96	DPWA	$K^- p \to \Lambda\eta$
12	[2] MARTIN	77	DPWA	$\overline{K}N$ multichannel

$\Lambda(1670)$ 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	$\Sigma(1385)\pi$		DESIG=4

The above branching fractions are our estimates, not fits or averages.

$\Lambda(1670)$ 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

→ NOT CHECKED ←

VALUE	*DOCUMENT ID*		*TECN*	*COMMENT*
0.20 to 0.30 OUR ESTIMATE				
0.37±0.07	MANLEY	02	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. • • •				
0.20±0.03	GOPAL	77	DPWA	See GOPAL 80
0.15	[2] MARTIN	77	DPWA	$\overline{K}N$ multichannel

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

NODE=B040R8

VALUE	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.30 ± 0.08	ABAEV	96	DPWA	$K^- p \to \Lambda\eta$

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

NODE=B040R3

VALUE	DOCUMENT ID		TECN	COMMENT
-0.38 ± 0.03	MANLEY	02	DPWA	$\overline{K}N$ 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. • • •				
-0.13	[2] MARTIN	77	DPWA	$\overline{K}N$ multichannel

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

NODE=B040R2

VALUE	DOCUMENT ID		TECN	COMMENT
$+0.24\pm0.04$	MANLEY	02	DPWA	$\overline{K}N$ multichannel
$+0.20\pm0.05$	BAXTER	73	DPWA	$K^- p \to$ neutrals
• • • We do not use the following data for averages, fits, limits, etc. • • •				
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 $N\overline{K} \to \Lambda(1670) \to \Sigma(1385)\pi$ $(\Gamma_1\Gamma_4)^{1/2}/\Gamma$

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	$K^- N \to \Sigma(1385)\pi$

$\Lambda(1670)$ FOOTNOTES

NODE=B040

[1] GARCIA-RECIO 03 gives pole, not Breit-Wigner, parameters, but the narrow width of the $\Lambda(1670)$ means there will be little difference. NODE=B040;LINKAGE=GR

[2] MARTIN 77 obtains identical resonance parameters from a T-matrix pole and from a Breit-Wigner fit. NODE=B040;LINKAGE=A

$\Lambda(1670)$ REFERENCES

NODE=B040

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