$\Lambda(1670)\ S_{01}$

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

$\Lambda(1670)$ MASS

VALUE (MeV)		DOCUMENT ID		TECN	COMMENT
1660 to 1680 (≈ 1670) OUR ESTIMATE					
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. • • •					
1669 ±2		ABAEV	96	DPWA	$\pi^- p \to \eta n$
1664	[1]	MARTIN	77	DPWA	$\overline{K}N$ multichannel

$\Lambda(1670)$ WIDTH

VALUE (MeV)		DOCUMENT ID		TECN	COMMENT
25 to 50 (≈ 35) OUR ESTIMATE					
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 ± 4		ABAEV	96	DPWA	$\pi^- p \to \eta n$
12	[1]	MARTIN	77	DPWA	$\overline{K}N$ multichannel

$\Lambda(1670)$ DECAY MODES

	Mode	Fraction (Γ_i/Γ)
Γ_1	$N\overline{K}$	15–25 %
Γ_2	$\Sigma\pi$	20–60 %
Γ_3	$\Lambda\eta$	15–35 %
Γ_4	$\Sigma(1385)\pi$	

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

$\Lambda(1670)$ 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
0.15 to 0.25 OUR ESTIMATE				
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	[1] MARTIN	77	DPWA	$\overline{K}N$ multichannel

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

VALUE	DOCUMENT ID		TECN	COMMENT
-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	[1] MARTIN	77	DPWA	$\overline{K}N$ multichannel

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

VALUE	DOCUMENT ID		TECN	COMMENT
$+0.20\pm0.05$	BAXTER	73	DPWA	$K^-p \to$ neutrals
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.06	ABAEV	96	DPWA	$\pi^-p \to \eta n$
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 $N\overline{K} \to \Lambda(1670) \to \Sigma(1385)\pi$ $(\Gamma_1\Gamma_4)^{1/2}/\Gamma$

VALUE	DOCUMENT ID		TECN	COMMENT
-0.18 ± 0.05	PREVOST	74	DPWA	$K^-N \to \Sigma(1385)\pi$

$\Lambda(1670)$ FOOTNOTES

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

$\Lambda(1670)$ REFERENCES

ABAEV	96	PR C53 385	+Nefkens	(UCLA)
KOISO	85	NP A433 619	+Sai, Yamamoto, Kofler	(TOKY, MASA)
PDG	82	PL 111B	Roos, Porter, Aguilar-Benitez+	(HELS, CIT, CERN)
GOPAL	80	Toronto Conf. 159		(RHEL) IJP
ALSTON-...	78	PR D18 182	Alston-Garnjost, Kenney+	(LBL, MTHO, CERN) IJP
Also	77	PRL 38 1007	Alston-Garnjost, Kenney+	(LBL, MTHO, CERN) IJP
GOPAL	77	NP B119 362	+Ross, VanHorn, McPherson+	(LOIC, RHEL) IJP
MARTIN	77	NP B127 349	+Pidcock, Moorhouse	(LOUC, GLAS) IJP
Also	77B	NP B126 266	Martin, Pidcock	(LOUC)
Also	77C	NP B126 285	Martin, Pidcock	(LOUC) IJP
HEPP	76B	PL 65B 487	+Braun, Grimm, Strobele+	(CERN, HEIDH, MPIM) IJP
LONDON	75	NP B85 289	+Yu, Boyd+	(BNL, CERN, EPOL, ORSAY, TORI)
KANE	74	LBL-2452		(LBL) IJP
PREVOST	74	NP B69 246	+Barloutaud+	(SACL, CERN, HEID)
BAXTER	73	NP B67 125	+Buckingham, Corbett, Dunn+	(OXF) IJP
KIM	71	PRL 27 356		(HARV) IJP
Also	70	Duke Conf. 161	Kim	(HARV) IJP
ARMENTEROS	69C	Lund Paper 229	+Baillon+	(CERN, HEID, SACL) IJP
Values are quoted in LEVI-SETTI 69.				
BERLEY	65	PRL 15 641	+Connolly, Hart, Rahm, Stonehill+	(BNL) IJP