NODE=B101

$\Lambda(1600)\ 1/2^+$

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

Λ(1600) POLE POSITION

NODE=B101225

REAL PART

NODE=B101RE
NODE=B101RE

VALUE (MeV)	DOCUMENT ID		TECN	COMMENT
1540 to 1560 (≈ 1550) OUR ESTIMATE				→ UNCHECKED ←
1546±6 OUR AVERAGE Error includes scale factor of 2.1.				
1562±8	SARANTSEV	19	DPWA	$\overline{K}N$ multichannel
1544^{+3}_{-3}	[1] KAMANO	15	DPWA	Multichannel
• • • We do not use the following data for averages, fits, limits, etc. • • •				
1572	ZHANG	13A	DPWA	Multichannel

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

NODE=B101RE;LINKAGE=A

−2×IMAGINARY PART

NODE=B101IM
NODE=B101IM

VALUE (MeV)	DOCUMENT ID		TECN	COMMENT
120 to 240 (≈ 180) OUR ESTIMATE				→ UNCHECKED ←
$159^{+60}_{=12}$ OUR AVERAGE Error includes scale factor of 6.2.				
232±15	SARANTSEV	19	DPWA	$\overline{K}N$ multichannel
112^{+12}_{-2}	[1] KAMANO	15	DPWA	Multichannel
• • • We do not use the following data for averages, fits, limits, etc. • • •				
138	ZHANG	13A	DPWA	Multichannel

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

NODE=B101IM;LINKAGE=C

Λ(1600) POLE RESIDUES

NODE=B101250

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

NODE=B101250

Normalized residue in $N\overline{K} \rightarrow \Lambda(1600) \rightarrow N\overline{K}$

NODE=B101A00
NODE=B101A00

MODULUS	PHASE (°)	DOCUMENT ID		TECN	COMMENT
0.36 ±0.07	**−63 ± 10**	SARANTSEV	19	DPWA	$\overline{K}N$ multichannel
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.105	−80	[1] KAMANO	15	DPWA	Multichannel

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

NODE=B101A00;LINKAGE=A

Normalized residue in $N\overline{K} \rightarrow \Lambda(1600) \rightarrow \Sigma\pi$

NODE=B101A01
NODE=B101A01

MODULUS	PHASE (°)	DOCUMENT ID		TECN	COMMENT
0.39 ±0.08	**148 ± 10**	SARANTSEV	19	DPWA	$\overline{K}N$ multichannel
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.232	108	[1] KAMANO	15	DPWA	Multichannel

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

NODE=B101A01;LINKAGE=A

Normalized residue in $N\overline{K} \rightarrow \Lambda(1600) \rightarrow \Lambda\eta$

NODE=B101A05
NODE=B101A05

MODULUS	PHASE (°)	DOCUMENT ID		TECN	COMMENT
0.22±0.13	**180 ± 20**	SARANTSEV	19	DPWA	$\overline{K}N$ multichannel

Normalized residue in $N\overline{K} \rightarrow \Lambda(1600) \rightarrow \Lambda\sigma$

NODE=B101A06
NODE=B101A06

MODULUS	PHASE (°)	DOCUMENT ID		TECN	COMMENT
0.30±0.06	**−70 ± 10**	SARANTSEV	19	DPWA	$\overline{K}N$ multichannel

Normalized residue in $N\overline{K} \rightarrow \Lambda(1600) \rightarrow \Sigma(1385)\pi$

NODE=B101A02
NODE=B101A02

MODULUS	PHASE (°)	DOCUMENT ID		TECN	COMMENT
0.37 ±0.07	**103 ± 12**	SARANTSEV	19	DPWA	$\overline{K}N$ multichannel
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.183	77	[1] KAMANO	15	DPWA	Multichannel

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

NODE=B101A02;LINKAGE=A

Normalized residue in $N\overline{K} \rightarrow \Lambda(1600) \rightarrow N\overline{K}^*(892)$, S=1/2, P-wave

NODE=B101A03
NODE=B101A03

MODULUS	PHASE (°)	DOCUMENT ID		TECN	COMMENT
0.02±0.01	**126 ± 45**	SARANTSEV	19	DPWA	$\overline{K}N$ multichannel

Normalized residue in $N\overline{K} \rightarrow \Lambda(1600) \rightarrow N\overline{K}^*(892)$, S=3/2, P-wave

NODE=B101A04
NODE=B101A04

MODULUS	PHASE (°)	DOCUMENT ID		TECN	COMMENT
0.02±0.01	**−135 ± 45**	SARANTSEV	19	DPWA	$\overline{K}N$ multichannel

$\Lambda(1600)$ MASS

NODE=B101M

NODE=B101M

VALUE (MeV)	DOCUMENT ID		TECN	COMMENT
1570 to 1630 (≈ 1600) OUR ESTIMATE				→ UNCHECKED ←
1570.5± 4.6±12.1	ABLIKIM	25AF	BES3	$\psi(3686) \rightarrow \Lambda\overline{\Sigma}^0\pi^0 +$ c.c. (PWA)
1605 ± 8	SARANTSEV	19	DPWA	$\overline{K}N$ multichannel
1592 ± 10	ZHANG	13A	DPWA	Multichannel
1568 ± 20	GOPAL	80	DPWA	$\overline{K}N \rightarrow \overline{K}N$
1703 ±100	ALSTON-...	78	DPWA	$\overline{K}N \rightarrow \overline{K}N$
1573 ± 25	GOPAL	77	DPWA	$\overline{K}N$ multichannel
1596 ± 6	KANE	74	DPWA	$K^-p \rightarrow \Sigma\pi$
1620 ± 10	LANGBEIN	72	IPWA	$\overline{K}N$ multichannel
• • • We do not use the following data for averages, fits, limits, etc. • • •				
1572 or 1617	[1] MARTIN	77	DPWA	$\overline{K}N$ multichannel
1646 ± 7	[2] CARROLL	76	DPWA	Isospin-0 total σ
1570	KIM	71	DPWA	K-matrix analysis

[1] The two MARTIN 77 values are from a T-matrix pole and from a Breit-Wigner fit. NODE=B101;LINKAGE=C
[2] A total cross-section bump with $(J+1/2)\ \Gamma_{el}\ /\ \Gamma_{total} = 0.04$. NODE=B101;LINKAGE=B

$\Lambda(1600)$ WIDTH

NODE=B101W

NODE=B101W

VALUE (MeV)	DOCUMENT ID		TECN	COMMENT
150 to 250 (≈ 200) OUR ESTIMATE				→ UNCHECKED ←
228.1± 11.9±34.8	ABLIKIM	25AF	BES3	$\psi(3686) \rightarrow \Lambda\overline{\Sigma}^0\pi^0 +$ c.c. (PWA)
245 ± 15	SARANTSEV	19	DPWA	$\overline{K}N$ multichannel
150 ± 28	ZHANG	13A	DPWA	Multichannel
116 ± 20	GOPAL	80	DPWA	$\overline{K}N \rightarrow \overline{K}N$
593 ±200	ALSTON-...	78	DPWA	$\overline{K}N \rightarrow \overline{K}N$
147 ± 50	GOPAL	77	DPWA	$\overline{K}N$ multichannel
175 ± 20	KANE	74	DPWA	$K^-p \rightarrow \Sigma\pi$
60 ± 10	LANGBEIN	72	IPWA	$\overline{K}N$ multichannel
• • • We do not use the following data for averages, fits, limits, etc. • • •				
247 or 271	[1] MARTIN	77	DPWA	$\overline{K}N$ multichannel
20	[2] CARROLL	76	DPWA	Isospin-0 total σ
50	KIM	71	DPWA	K-matrix analysis

[1] The two MARTIN 77 values are from a T-matrix pole and from a Breit-Wigner fit. NODE=B101W;LINKAGE=C
[2] A total cross-section bump with $(J+1/2)\ \Gamma_{el}\ /\ \Gamma_{total} = 0.04$. NODE=B101W;LINKAGE=B

$\Lambda(1600)$ DECAY MODES

NODE=B101215;NODE=B101

	Mode	Fraction (Γ_i/Γ)	
Γ_1	$N\overline{K}$	15–30 %	DESIG=1;OUR EST
Γ_2	$\Sigma\pi$	10–60 %	DESIG=2;OUR EST
Γ_3	$\Lambda\sigma$	(19±4) %	DESIG=5
Γ_4	$\Sigma(1385)\pi$	(9±4) %	DESIG=3

$\Lambda(1600)$ BRANCHING RATIOS

NODE=B101220

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

NODE=B101220

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

NODE=B101R1
NODE=B101R1

VALUE	DOCUMENT ID		TECN	COMMENT
0.14 to 0.28 OUR ESTIMATE				→ UNCHECKED ←
0.29 ±0.06	SARANTSEV	19	DPWA	$\overline{K}N$ multichannel
0.14 ±0.04	ZHANG	13A	DPWA	Multichannel
0.23 ±0.04	GOPAL	80	DPWA	$\overline{K}N \rightarrow \overline{K}N$
0.14 ±0.05	ALSTON-...	78	DPWA	$\overline{K}N \rightarrow \overline{K}N$
0.25 ±0.15	LANGBEIN	72	IPWA	$\overline{K}N$ multichannel

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

0.064	[1] KAMANO	15	DPWA	Multichannel	OCCUR=2
0.24 ±0.04	GOPAL	77	DPWA	See GOPAL 80	
0.30 or 0.29	[2] MARTIN	77	DPWA	$\overline{K}N$ multichannel	

[1] From the preferred solution A in KAMANO 15. NODE=B101R1;LINKAGE=B

[2] The two MARTIN 77 values are from a T-matrix pole and from a Breit-Wigner fit. NODE=B101R1;LINKAGE=C

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

NODE=B101R00

VALUE	DOCUMENT ID		TECN	COMMENT
0.37 ±0.07	SARANTSEV	19	DPWA	$\overline{K}N$ multichannel

NODE=B101R00

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

0.851	[1] KAMANO	15	DPWA	Multichannel

[1] From the preferred solution A in KAMANO 15. NODE=B101R00;LINKAGE=A

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

NODE=B101R02

VALUE	DOCUMENT ID		TECN	COMMENT
0.19±0.04	SARANTSEV	19	DPWA	$\overline{K}N$ multichannel

NODE=B101R02

$\Gamma(\Sigma(1385)\pi)/\Gamma_{total}$ Γ_4/Γ

NODE=B101R01

VALUE	DOCUMENT ID		TECN	COMMENT
0.09 ±0.04	SARANTSEV	19	DPWA	$\overline{K}N$ multichannel

NODE=B101R01

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

0.085	[1] KAMANO	15	DPWA	Multichannel

[1] From the preferred solution A in KAMANO 15. NODE=B101R01;LINKAGE=A

$(\Gamma_i\Gamma_f)^{1/2}/\Gamma_{total}$ in $N\overline{K} \to \Lambda(1600) \to \Sigma\pi$ $(\Gamma_1\Gamma_2)^{1/2}/\Gamma$

NODE=B101R2

VALUE	DOCUMENT ID		TECN	COMMENT
−0.23±0.03	ZHANG	13A	DPWA	Multichannel
−0.16±0.04	GOPAL	77	DPWA	$\overline{K}N$ multichannel
−0.33±0.11	KANE	74	DPWA	$K^-p \to \Sigma\pi$
0.28±0.09	LANGBEIN	72	IPWA	$\overline{K}N$ multichannel

NODE=B101R2

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

−0.39 or −0.39	[1] MARTIN	77	DPWA	$\overline{K}N$ multichannel	
not seen	HEPP	76B	DPWA	$K^-N \to \Sigma\pi$	

[1] The two MARTIN 77 values are from a T-matrix pole and from a Breit-Wigner fit. NODE=B101R2;LINKAGE=C

$\Lambda(1600)$ REFERENCES

NODE=B101

ABLIKIM	25AF	JHEP 2502 212	M. Ablikim *et al.*	(BESIII Collab.)	REFID=63277
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
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
CARROLL	76	PRL 37 806	A.S. Carroll *et al.*	(BNL) I	REFID=31760
HEPP	76B	PL 65B 487	V. Hepp *et al.*	(CERN, HEIDH, MPIM) IJP	REFID=31761
KANE	74	LBL-2452	D.F. Kane	(LBL) IJP	REFID=31759
LANGBEIN	72	NP B47 477	W. Langbein, F. Wagner	(MPIM) IJP	REFID=31758
KIM	71	PRL 27 356	J.K. Kim	(HARV) IJP	REFID=31740