NODE=B077

$\Lambda(1810)\ 1/2^+$

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

Almost all the recent analyses contain a P_{01} state, and sometimes two of them, but the masses, widths, and branching ratios vary greatly. See also the $\Lambda(1600)$ P_{01}.

NODE=B077

$\Lambda(1810)$ MASS

NODE=B077M

VALUE (MeV)	DOCUMENT ID		TECN	COMMENT
1750 to 1850 (≈ 1810) OUR ESTIMATE				
1841±20	GOPAL	80	DPWA	$\overline{K}N \to \overline{K}N$
1853±20	GOPAL	77	DPWA	$\overline{K}N$ multichannel
1735± 5	CARROLL	76	DPWA	Isospin-0 total σ
1746±10	PREVOST	74	DPWA	$K^-N \to \Sigma(1385)\pi$
1780±20	LANGBEIN	72	IPWA	$\overline{K}N$ multichannel
• • • We do not use the following data for averages, fits, limits, etc. • • •				
1861 or 1953	[1] MARTIN	77	DPWA	$\overline{K}N$ multichannel
1755	KIM	71	DPWA	K-matrix analysis
1800	ARMENTEROS	70	HBC	$\overline{K}N \to \overline{K}N$
1750	ARMENTEROS	70	HBC	$\overline{K}N \to \Sigma\pi$
1690±10	BARBARO-...	70	HBC	$\overline{K}N \to \Sigma\pi$
1740	BAILEY	69	DPWA	$\overline{K}N \to \overline{K}N$
1745	ARMENTEROS	68B	HBC	$\overline{K}N \to \overline{K}N$

NODE=B077M

NODE=B077M

→ UNCHECKED ←

OCCUR=2

$\Lambda(1810)$ WIDTH

NODE=B077W

VALUE (MeV)	DOCUMENT ID		TECN	COMMENT
50 to 250 (≈ 150) OUR ESTIMATE				
164±20	GOPAL	80	DPWA	$\overline{K}N \to \overline{K}N$
90±20	CAMERON	78B	DPWA	$K^-p \to N\overline{K}^*$
166±20	GOPAL	77	DPWA	$\overline{K}N$ multichannel
46±20	PREVOST	74	DPWA	$K^-N \to \Sigma(1385)\pi$
120±10	LANGBEIN	72	IPWA	$\overline{K}N$ multichannel
• • • We do not use the following data for averages, fits, limits, etc. • • •				
535 or 585	[1] MARTIN	77	DPWA	$\overline{K}N$ multichannel
28	CARROLL	76	DPWA	Isospin-0 total σ
35	KIM	71	DPWA	K-matrix analysis
30	ARMENTEROS	70	HBC	$\overline{K}N \to \overline{K}N$
70	ARMENTEROS	70	HBC	$\overline{K}N \to \Sigma\pi$
22	BARBARO-...	70	HBC	$\overline{K}N \to \Sigma\pi$
300	BAILEY	69	DPWA	$\overline{K}N \to \overline{K}N$
147	ARMENTEROS	68B	HBC	

NODE=B077W

NODE=B077W

→ UNCHECKED ←

OCCUR=2

$\Lambda(1810)$ DECAY MODES

NODE=B077215;NODE=B077

	Mode	Fraction (Γ_i/Γ)	
Γ_1	$N\overline{K}$	20–50 %	DESIG=1;OUR EST
Γ_2	$\Sigma\pi$	10–40 %	DESIG=2;OUR EST
Γ_3	$\Sigma(1385)\pi$	seen	DESIG=3;OUR EST
Γ_4	$N\overline{K}^*(892)$	30–60 %	DESIG=181;OUR EST
Γ_5	$N\overline{K}^*(892)$, S=1/2, P-wave		DESIG=4
Γ_6	$N\overline{K}^*(892)$, S=3/2, P-wave		DESIG=5

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

$\Lambda(1810)$ BRANCHING RATIOS

NODE=B077220

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

NODE=B077220

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

NODE=B077R1

NODE=B077R1

VALUE	DOCUMENT ID		TECN	COMMENT
0.2 to 0.5 OUR ESTIMATE				
0.24±0.04	GOPAL	80	DPWA	$\overline{K}N \to \overline{K}N$
0.36±0.05	LANGBEIN	72	IPWA	$\overline{K}N$ multichannel

→ UNCHECKED ←

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

0.21±0.04	GOPAL	77	DPWA	See GOPAL 80
0.52 or 0.49	[1] MARTIN	77	DPWA	$\overline{K}N$ multichannel
0.30	KIM	71	DPWA	K-matrix analysis
0.15	ARMENTEROS	70	DPWA	$\overline{K}N \to \overline{K}N$
0.55	BAILEY	69	DPWA	$\overline{K}N \to \overline{K}N$
0.4	ARMENTEROS	68B	DPWA	$\overline{K}N \to \overline{K}N$

$(\Gamma_i\Gamma_f)^{1/2}/\Gamma_{total}$ in $N\overline{K} \to \Lambda(1810) \to \Sigma\pi$ — $(\Gamma_1\Gamma_2)^{1/2}/\Gamma$

NODE=B077R2
NODE=B077R2

VALUE	DOCUMENT ID		TECN	COMMENT
−0.24±0.04	GOPAL	77	DPWA	$\overline{K}N$ multichannel

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

+0.25 or +0.23	[1] MARTIN	77	DPWA	$\overline{K}N$ multichannel
< 0.01	LANGBEIN	72	IPWA	$\overline{K}N$ multichannel
0.17	KIM	71	DPWA	K-matrix analysis
+0.20	[2] ARMENTEROS	70	DPWA	$\overline{K}N \to \Sigma\pi$
−0.13±0.03	BARBARO-...	70	DPWA	$\overline{K}N \to \Sigma\pi$

$(\Gamma_i\Gamma_f)^{1/2}/\Gamma_{total}$ in $N\overline{K} \to \Lambda(1810) \to \Sigma(1385)\pi$ — $(\Gamma_1\Gamma_3)^{1/2}/\Gamma$

NODE=B077R3
NODE=B077R3

VALUE	DOCUMENT ID		TECN	COMMENT
+0.18±0.10	PREVOST	74	DPWA	$K^-N \to \Sigma(1385)\pi$

$(\Gamma_i\Gamma_f)^{1/2}/\Gamma_{total}$ in $N\overline{K} \to \Lambda(1810) \to N\overline{K}^*(892)$, S=1/2, P-wave — $(\Gamma_1\Gamma_5)^{1/2}/\Gamma$

NODE=B077R4
NODE=B077R4

VALUE	DOCUMENT ID		TECN	COMMENT
−0.14±0.03	[2] CAMERON	78B	DPWA	$K^-p \to N\overline{K}^*$

$(\Gamma_i\Gamma_f)^{1/2}/\Gamma_{total}$ in $N\overline{K} \to \Lambda(1810) \to N\overline{K}^*(892)$, S=3/2, P-wave — $(\Gamma_1\Gamma_6)^{1/2}/\Gamma$

NODE=B077R5
NODE=B077R5

VALUE	DOCUMENT ID		TECN	COMMENT
+0.35±0.06	CAMERON	78B	DPWA	$K^-p \to N\overline{K}^*$

$\Lambda(1810)$ FOOTNOTES

NODE=B077

[1] The two MARTIN 77 values are from a T-matrix pole and from a Breit-Wigner fit. NODE=B077;LINKAGE=B

[2] The published sign has been changed to be in accord with the baryon-first convention. NODE=B077;LINKAGE=E

$\Lambda(1810)$ REFERENCES

NODE=B077

GOPAL	80	Toronto Conf. 159	G.P. Gopal	(RHEL)	IJP	REFID=31755
CAMERON	78B	NP B146 327	W. Cameron *et al.*	(RHEL, LOIC)	IJP	REFID=31838
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
PREVOST	74	NP B69 246	J. Prevost *et al.*	(SACL, CERN, HEID)		REFID=31785
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
Also		Duke Conf. 161	J.K. Kim	(HARV)	IJP	REFID=31741
Hyperon Resonances, 1970						
ARMENTEROS	70	Duke Conf. 123	R. Armenteros *et al.*	(CERN, HEID, SACL)	IJP	REFID=31842
Hyperon Resonances, 1970						
BARBARO-...	70	Duke Conf. 173	A. Barbaro-Galtieri	(LRL)	IJP	REFID=31777
Hyperon Resonances, 1970						
BAILEY	69	Thesis UCRL 50617	J.M. Bailey	(LLL)	IJP	REFID=31841
ARMENTEROS	68B	NP B8 195	R. Armenteros *et al.*	(CERN, HEID, SACL)	IJP	REFID=31867