NODE=B067

$\Sigma(1880)$ $1/2^+$

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

OMITTED FROM SUMMARY TABLE

NODE=B067

A P_{11} resonance is suggested by several partial-wave analyses, but with wide variations in the mass and other parameters. We list here all claims which lie well above the P_{11} $\Sigma(1770)$.

$\Sigma(1880)$ POLE POSITION

NODE=B067225

REAL PART

NODE=B067RE
NODE=B067RE

VALUE (MeV)	*DOCUMENT ID*		*TECN*	*COMMENT*
• • • We do not use the following data for averages, fits, limits, etc. • • •				
1776	ZHANG	13A	DPWA	Multichannel

$-2\times$IMAGINARY PART

NODE=B067IM
NODE=B067IM

VALUE (MeV)	*DOCUMENT ID*		*TECN*	*COMMENT*
• • • We do not use the following data for averages, fits, limits, etc. • • •				
270	ZHANG	13A	DPWA	Multichannel

$\Sigma(1880)$ MASS

NODE=B067M

NODE=B067M

→ UNCHECKED ←

VALUE (MeV)	*DOCUMENT ID*		*TECN*	*COMMENT*
1820 to 1940 (≈ 1880) OUR ESTIMATE				
1821±17	ZHANG	13A	DPWA	Multichannel
1826±20	GOPAL	80	DPWA	$\overline{K}N \to \overline{K}N$
1870±10	CAMERON	78B	DPWA	$K^- p \to N\overline{K}^*$
1847 or 1863	[1] MARTIN	77	DPWA	$\overline{K}N$ multichannel
1960±30	[2] BAILLON	75	IPWA	$\overline{K}N \to \Lambda\pi$
1985±50	VANHORN	75	DPWA	$K^- p \to \Lambda\pi^0$
1898	[3] LEA	73	DPWA	Multichannel K-matrix
∼ 1850	ARMENTEROS	70	IPWA	$\overline{K}N \to \overline{K}N$
1950±50	BARBARO-...	70	DPWA	$K^- N \to \Lambda\pi$
1920±30	LITCHFIELD	70	DPWA	$K^- N \to \Lambda\pi$
1850	BAILEY	69	DPWA	$\overline{K}N \to \overline{K}N$
1882±40	SMART	68	DPWA	$K^- N \to \Lambda\pi$

$\Sigma(1880)$ WIDTH

NODE=B067W

NODE=B067W

→ UNCHECKED ←

VALUE (MeV)	*DOCUMENT ID*		*TECN*	*COMMENT*
100 to 300 (≈ 200) OUR ESTIMATE				
300± 59	ZHANG	13A	DPWA	Multichannel
86± 15	GOPAL	80	DPWA	$\overline{K}N \to \overline{K}N$
80± 10	CAMERON	78B	DPWA	$K^- p \to N\overline{K}^*$
216 or 220	[1] MARTIN	77	DPWA	$\overline{K}N$ multichannel
260± 40	[2] BAILLON	75	IPWA	$\overline{K}N \to \Lambda\pi$
220±140	VANHORN	75	DPWA	$K^- p \to \Lambda\pi^0$
222	[3] LEA	73	DPWA	Multichannel K-matrix
∼ 30	ARMENTEROS	70	IPWA	$\overline{K}N \to \overline{K}N$
200± 50	BARBARO-...	70	DPWA	$K^- N \to \Lambda\pi$
170± 40	LITCHFIELD	70	DPWA	$K^- N \to \Lambda\pi$
200	BAILEY	69	DPWA	$\overline{K}N \to \overline{K}N$
222±150	SMART	68	DPWA	$K^- N \to \Lambda\pi$

$\Sigma(1880)$ DECAY MODES

NODE=B067215;NODE=B067

	Mode	Fraction (Γ_i/Γ)	
Γ_1	$N\overline{K}$	0.10 to 0.30 (≈ 0.20)	DESIG=1
Γ_2	$\Lambda\pi$		DESIG=2
Γ_3	$\Sigma\pi$		DESIG=3
Γ_4	$\Lambda(1520)\pi$, D-wave	(2.0 ±1.0) %	DESIG=6
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
Γ_7	$\Delta(1232)\overline{K}$, P-wave	(39 ±8) %	DESIG=7

$\Sigma(1880)$ BRANCHING RATIOS

NODE=B067220

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

NODE=B067220

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

NODE=B067R1
NODE=B067R1

VALUE	DOCUMENT ID		TECN	COMMENT
0.10 to 0.30 (≈ 0.20) OUR ESTIMATE				
0.10 ± 0.03	ZHANG	13A	DPWA	Multichannel
0.06 ± 0.02	GOPAL	80	DPWA	$\overline{K}N \to \overline{K}N$
0.27 or 0.27	[1] MARTIN	77	DPWA	$\overline{K}N$ multichannel
0.31	[3] LEA	73	DPWA	Multichannel K-matrix
0.20	ARMENTEROS	70	IPWA	$\overline{K}N \to \overline{K}N$
0.22	BAILEY	69	DPWA	$\overline{K}N \to \overline{K}N$

→ UNCHECKED ←

$(\Gamma_i\Gamma_f)^{1/2}/\Gamma_{total}$ in $N\overline{K} \to \Sigma(1880) \to \Lambda\pi$ $(\Gamma_1\Gamma_2)^{1/2}/\Gamma$

NODE=B067R2
NODE=B067R2

VALUE	DOCUMENT ID		TECN	COMMENT
-0.24 or -0.24	[1] MARTIN	77	DPWA	$\overline{K}N$ multichannel
-0.12 ± 0.02	[2] BAILLON	75	IPWA	$\overline{K}N \to \Lambda\pi$
$+0.05 {}^{+0.07}_{-0.02}$	VANHORN	75	DPWA	$K^- p \to \Lambda\pi^0$
-0.169 ± 0.119	DEVENISH	74B		Fixed-t dispersion rel.
-0.30	[3] LEA	73	DPWA	Multichannel K-matrix
-0.09 ± 0.04	BARBARO-...	70	DPWA	$K^- N \to \Lambda\pi$
-0.14 ± 0.03	LITCHFIELD	70	DPWA	$K^- N \to \Lambda\pi$
-0.11 ± 0.03	SMART	68	DPWA	$K^- N \to \Lambda\pi$

$(\Gamma_i\Gamma_f)^{1/2}/\Gamma_{total}$ in $N\overline{K} \to \Sigma(1880) \to \Sigma\pi$ $(\Gamma_1\Gamma_3)^{1/2}/\Gamma$

NODE=B067R3
NODE=B067R3

VALUE	DOCUMENT ID		TECN	COMMENT
$+0.30$ or $+0.29$	[1] MARTIN	77	DPWA	$\overline{K}N$ multichannel
not seen	[3] LEA	73	DPWA	Multichannel K-matrix

$\Gamma(\Lambda(1520)\pi, D\text{-wave})/\Gamma_{total}$ Γ_4/Γ

NODE=B067R01
NODE=B067R01

VALUE	DOCUMENT ID		TECN	COMMENT
0.02 ± 0.01	ZHANG	13A	DPWA	Multichannel

$(\Gamma_i\Gamma_f)^{1/2}/\Gamma_{total}$ in $N\overline{K} \to \Sigma(1880) \to N\overline{K}^*(892)$, S=1/2, P-wave $(\Gamma_1\Gamma_5)^{1/2}/\Gamma$

NODE=B067R4
NODE=B067R4

VALUE	DOCUMENT ID		TECN	COMMENT
-0.05 ± 0.03	[4] CAMERON	78B	DPWA	$K^- p \to N\overline{K}^*$

$(\Gamma_i\Gamma_f)^{1/2}/\Gamma_{total}$ in $N\overline{K} \to \Sigma(1880) \to N\overline{K}^*(892)$, S=3/2, P-wave $(\Gamma_1\Gamma_6)^{1/2}/\Gamma$

NODE=B067R5
NODE=B067R5

VALUE	DOCUMENT ID		TECN	COMMENT
$+0.11 \pm 0.03$	CAMERON	78B	DPWA	$K^- p \to N\overline{K}^*$

$\Gamma(\Delta(1232)\overline{K}, P\text{-wave})/\Gamma_{total}$ Γ_7/Γ

NODE=B067R02
NODE=B067R02

VALUE	DOCUMENT ID		TECN	COMMENT
0.39 ± 0.08	ZHANG	13A	DPWA	Multichannel

$\Sigma(1880)$ FOOTNOTES

NODE=B067

[1] The two MARTIN 77 values are from a T-matrix pole and from a Breit-Wigner fit. NODE=B067;LINKAGE=C
[2] From solution 1 of BAILLON 75; not present in solution 2. NODE=B067;LINKAGE=B
[3] Only unconstrained states from table 1 of LEA 73 are listed. NODE=B067;LINKAGE=A
[4] The published sign has been changed to be in accord with the baryon-first convention. NODE=B067;LINKAGE=D

$\Sigma(1880)$ REFERENCES

NODE=B067

ZHANG	13A	PR C88 035205	H. Zhang *et al.*	(KSU)	REFID=55441
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
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
BAILLON	75	NP B94 39	P.H. Baillon, P.J. Litchfield	(CERN, RHEL) IJP	REFID=32089
VANHORN	75	NP B87 145	A.J. van Horn	(LBL) IJP	REFID=32093
Also		NP B87 157	A.J. van Horn	(LBL) IJP	REFID=32094
DEVENISH	74B	NP B81 330	R.C.E. Devenish, C.D. Froggatt, B.R. Martin	(DESY+)	REFID=30036
LEA	73	NP B56 77	A.T. Lea *et al.*	(RHEL, LOUC, GLAS, AARH) IJP	REFID=31929
ARMENTEROS	70	Duke Conf. 123, Hyperon Resonances, 1970	R. Armenteros *et al.*	(CERN, HEID, SACL) IJP	REFID=31842
BARBARO-...	70	Duke Conf. 173, Hyperon Resonances, 1970	A. Barbaro-Galtieri	(LRL) IJP	REFID=31777
LITCHFIELD	70	NP B22 269	P.J. Litchfield	(RHEL) IJP	REFID=32293
BAILEY	69	Thesis UCRL 50617	J.M. Bailey	(LLL) IJP	REFID=31841
SMART	68	PR 169 1330	W.M. Smart	(LRL) IJP	REFID=32253