NODE=B056

$\Lambda(1830)\ 5/2^-$

$I(J^P) = 0(\frac{5}{2}^-)$ Status: ****

For results published before 1973 (they are now obsolete), see our 1982 edition Physics Letters **111B** 1 (1982). NODE=B056

The best evidence for this resonance is in the $\Sigma\pi$ channel.

$\Lambda(1830)$ MASS

NODE=B056M

VALUE (MeV)	DOCUMENT ID		TECN	COMMENT
1810 to 1830 (≈ 1830) OUR ESTIMATE				
1831±10	GOPAL	80	DPWA	$\overline{K}N \to \overline{K}N$
1825±10	GOPAL	77	DPWA	$\overline{K}N$ multichannel
1825± 1	KANE	74	DPWA	$K^-p \to \Sigma\pi$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
1817 or 1818	[1] MARTIN	77	DPWA	$\overline{K}N$ multichannel

NODE=B056M
NODE=B056M
→ UNCHECKED ←

$\Lambda(1830)$ WIDTH

NODE=B056W

VALUE (MeV)	DOCUMENT ID		TECN	COMMENT
60 to 110 (≈ 95) OUR ESTIMATE				
100±10	GOPAL	80	DPWA	$\overline{K}N \to \overline{K}N$
94±10	GOPAL	77	DPWA	$\overline{K}N$ multichannel
119± 3	KANE	74	DPWA	$K^-p \to \Sigma\pi$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
56 or 56	[1] MARTIN	77	DPWA	$\overline{K}N$ multichannel

NODE=B056W
NODE=B056W
→ UNCHECKED ←

$\Lambda(1830)$ DECAY MODES

NODE=B056215;NODE=B056

	Mode	Fraction (Γ_i/Γ)	
Γ_1	$N\overline{K}$	3–10 %	DESIG=1;OUR EST
Γ_2	$\Sigma\pi$	35–75 %	DESIG=2;OUR EST
Γ_3	$\Sigma(1385)\pi$	>15 %	DESIG=3;OUR EST
Γ_4	$\Sigma(1385)\pi$, D-wave		DESIG=33
Γ_5	$\Lambda\eta$		DESIG=4

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

$\Lambda(1830)$ BRANCHING RATIOS

NODE=B056220

See "Sign conventions for resonance couplings" in the Note on Λ and Σ Resonances. NODE=B056220

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

NODE=B056R1
NODE=B056R1

VALUE	DOCUMENT ID		TECN	COMMENT
0.03 to 0.10 OUR ESTIMATE				
0.08±0.03	GOPAL	80	DPWA	$\overline{K}N \to \overline{K}N$
0.02±0.02	ALSTON-...	78	DPWA	$\overline{K}N \to \overline{K}N$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.04±0.03	GOPAL	77	DPWA	See GOPAL 80
0.04 or 0.04	[1] MARTIN	77	DPWA	$\overline{K}N$ multichannel

→ UNCHECKED ←

$(\Gamma_i\Gamma_f)^{1/2}/\Gamma_{total}$ in $N\overline{K} \to \Lambda(1830) \to \Sigma\pi$ — $(\Gamma_1\Gamma_2)^{1/2}/\Gamma$

NODE=B056R2
NODE=B056R2

VALUE	DOCUMENT ID		TECN	COMMENT
−0.17±0.03	GOPAL	77	DPWA	$\overline{K}N$ multichannel
−0.15±0.01	KANE	74	DPWA	$K^-p \to \Sigma\pi$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
−0.17 or −0.17	[1] MARTIN	77	DPWA	$\overline{K}N$ multichannel

$(\Gamma_i\Gamma_f)^{1/2}/\Gamma_{total}$ in $N\overline{K} \to \Lambda(1830) \to \Lambda\eta$ — $(\Gamma_1\Gamma_5)^{1/2}/\Gamma$

NODE=B056R3
NODE=B056R3

VALUE	DOCUMENT ID		TECN
−0.044±0.020	RADER	73	MPWA

$(\Gamma_i\Gamma_f)^{1/2}/\Gamma_{total}$ in $N\overline{K} \rightarrow \Lambda(1830) \rightarrow \Sigma(1385)\pi$ $(\Gamma_1\Gamma_3)^{1/2}/\Gamma$ NODE=B056R4

VALUE	DOCUMENT ID		TECN	COMMENT
$+0.141 \pm 0.014$	[2] CAMERON	78	DPWA	$K^- p \rightarrow \Sigma(1385)\pi$
$+0.13 \pm 0.03$	PREVOST	74	DPWA	$K^- N \rightarrow \Sigma(1385)\pi$

NODE=B056R4

$\Lambda(1830)$ FOOTNOTES

NODE=B056

[1] The two MARTIN 77 values are from a T-matrix pole and from a Breit-Wigner fit. NODE=B056;LINKAGE=A

[2] The CAMERON 78 upper limit on G-wave decay is 0.03. The published sign has been changed to be in accord with the baryon-first convention. NODE=B056;LINKAGE=C

$\Lambda(1830)$ REFERENCES

NODE=B056

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
CAMERON	78	NP B143 189	W. Cameron *et al.*	(RHEL, LOIC) IJP	REFID=31837
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
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
RADER	73	NC 16A 178	R.K. Rader *et al.*	(SACL, HEID, CERN+)	REFID=31882