$\Lambda(1830)$ D_{05}

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

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

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

$\Lambda(1830)$ MASS

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

$\Lambda(1830)$ WIDTH

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

$\Lambda(1830)$ DECAY MODES

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

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

Λ(1830) 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
0.03 to 0.10 OUR ESTIMATE				
0.08±0.03	GOPAL	80	DPWA	$\overline{K}N \rightarrow \overline{K}N$
0.02±0.02	ALSTON-...	78	DPWA	$\overline{K}N \rightarrow \overline{K}N$
• • • 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

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

VALUE	DOCUMENT ID		TECN	COMMENT
−0.17±0.03	GOPAL	77	DPWA	$\overline{K}N$ multichannel
−0.15±0.01	KANE	74	DPWA	$K^-p \rightarrow \Sigma\pi$
• • • 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 $N\overline{K} \rightarrow \Lambda(1830) \rightarrow \Lambda\eta$ $(\Gamma_1\Gamma_5)^{1/2}/\Gamma$

VALUE	DOCUMENT ID		TECN
−0.044±0.020	RADER	73	MPWA

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

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

Λ(1830) FOOTNOTES

[1] The two MARTIN 77 values are from a T-matrix pole and from a Breit-Wigner fit.

[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.

Λ(1830) REFERENCES

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
CAMERON	78	NP B143 189	+Franek, Gopal, Bacon, Butterworth+	(RHEL, LOIC) 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
KANE	74	LBL-2452		(LBL) IJP
PREVOST	74	NP B69 246	+Barloutaud+	(SACL, CERN, HEID)
RADER	73	NC 16A 178	+Barloutaud+	(SACL, HEID, CERN, RHEL, CDEF)