

$\Lambda(1830) D_{05}$

$I(J^P) = 0(\frac{5}{2}^-)$ 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 $\pm$ 10	GOPAL	80	DPWA $\overline{K}N \rightarrow \overline{K}N$
1825 $\pm$ 10	GOPAL	77	DPWA $\overline{K}N$ multichannel
1825 $\pm$ 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 $\pm$ 10	GOPAL	80	DPWA $\overline{K}N \rightarrow \overline{K}N$
94 $\pm$ 10	GOPAL	77	DPWA $\overline{K}N$ multichannel
119 $\pm$ 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 $\Sigma(1385)\pi$, <i>D</i> -wave	
Γ_5 $\Lambda\eta$	

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

$\Lambda(1830)$ BRANCHING RATIOS

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

$\Gamma(N\overline{K})/\Gamma_{\text{total}}$				Γ_1/Γ
VALUE	DOCUMENT ID	TECN	COMMENT	
0.03 to 0.10 OUR ESTIMATE				
0.08 $\pm$ 0.03	GOPAL	80	DPWA $\overline{K}N \rightarrow \overline{K}N$	
0.02 $\pm$ 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

$(\Gamma_i \Gamma_f)^{1/2} / \Gamma_{\text{total}}$ 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

$(\Gamma_i \Gamma_f)^{1/2} / \Gamma_{\text{total}}$ in $N\overline{K} \rightarrow \Lambda(1830) \rightarrow \Lambda \eta$				$(\Gamma_1 \Gamma_5)^{1/2} / \Gamma$
VALUE	DOCUMENT ID	TECN	COMMENT	
−0.044±0.020	RADER	73	MPWA	

$(\Gamma_i \Gamma_f)^{1/2} / \Gamma_{\text{total}}$ 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	$K^- N \rightarrow \Sigma(1385) \pi$

$\Lambda(1830)$ 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.

$\Lambda(1830)$ REFERENCES

PDG	82	PL 111B	M. Roos <i>et al.</i>	(HELS, CIT, CERN)
GOPAL	80	Toronto Conf. 159	G.P. Gopal	(RHEL) IJP
ALSTON-...	78	PR D18 182	M. Alston-Garnjost <i>et al.</i>	(LBL, MTHO+) IJP
Also	77	PRL 38 1007	M. Alston-Garnjost <i>et al.</i>	(LBL, MTHO+) IJP
CAMERON	78	NP B143 189	W. Cameron <i>et al.</i>	(RHEL, LOIC) IJP
GOPAL	77	NP B119 362	G.P. Gopal <i>et al.</i>	(LOIC, RHEL) IJP
MARTIN	77	NP B127 349	B.R. Martin, M.K. Pidcock, R.G. Moorhouse	(LOUC+) IJP
Also	77B	NP B126 266	B.R. Martin, M.K. Pidcock	(LOUC)
Also	77C	NP B126 285	B.R. Martin, M.K. Pidcock	(LOUC) IJP
KANE	74	LBL-2452	D.F. Kane	(LBL) IJP
PREVOST	74	NP B69 246	J. Prevost <i>et al.</i>	(SACL, CERN, HEID)
RADER	73	NC 16A 178	R.K. Rader <i>et al.</i>	(SACL, HEID, CERN+)