

$\Lambda(1830) 5/2^-$ $I(J^P) = 0(\frac{5}{2}^-)$ Status: ****

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

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

 $\Lambda(1830)$ MASS

<u>VALUE (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
1810 to 1830 (≈ 1830) OUR ESTIMATE			
1820 \pm 4	ZHANG	13A	DPWA Multichannel
1831 \pm 10	GOPAL	80	DPWA $\bar{K}N \rightarrow \bar{K}N$
1825 \pm 10	GOPAL	77	DPWA $\bar{K}N$ 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 $\bar{K}N$ multichannel

 $\Lambda(1830)$ WIDTH

<u>VALUE (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
60 to 110 (≈ 95) OUR ESTIMATE			
114 \pm 10	ZHANG	13A	DPWA Multichannel
100 \pm 10	GOPAL	80	DPWA $\bar{K}N \rightarrow \bar{K}N$
94 \pm 10	GOPAL	77	DPWA $\bar{K}N$ 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 $\bar{K}N$ multichannel

 $\Lambda(1830)$ POLE POSITION**REAL PART**

<u>VALUE (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●			
1809	ZHANG	13A	DPWA Multichannel

-2×IMAGINARY PART

<u>VALUE (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●			
109	ZHANG	13A	DPWA Multichannel

$\Lambda(1830)$ DECAY MODES

Mode	Fraction (Γ_i/Γ)
Γ_1 $N\bar{K}$	3–10 %
Γ_2 $\Sigma\pi$	35–75 %
Γ_3 $\Sigma(1385)\pi$	>15 %
The above branching fractions are our estimates, not fits or averages.	
Γ_4 $\Sigma(1385)\pi$, <i>D</i> -wave	(52±6) %
Γ_5 $\Lambda\eta$	

$\Lambda(1830)$ BRANCHING RATIOS

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

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

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
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0.03 to 0.10 OUR ESTIMATE

0.041±0.005	ZHANG	13A	DPWA Multichannel
0.08 ±0.03	GOPAL	80	DPWA $\bar{K}N \rightarrow \bar{K}N$
0.02 ±0.02	ALSTON-...	78	DPWA $\bar{K}N \rightarrow \bar{K}N$
• • • 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 $\bar{K}N$ multichannel

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

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
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−0.13±0.01	ZHANG	13A	DPWA Multichannel
−0.17±0.03	GOPAL	77	DPWA $\bar{K}N$ 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 $\bar{K}N$ multichannel

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

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

$\Gamma(\Sigma(1385)\pi, D\text{-wave})/\Gamma_{\text{total}}$ Γ_4/Γ

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
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0.52±0.06	ZHANG	13A	DPWA Multichannel
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$(\Gamma_i\Gamma_f)^{1/2}/\Gamma_{\text{total}}$ in $N\bar{K} \rightarrow \Lambda(1830) \rightarrow \Lambda\eta$ $(\Gamma_1\Gamma_5)^{1/2}/\Gamma$

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>
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−0.044±0.020	RADER	73 MPWA
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$\Lambda(1830)$ FOOTNOTES

- ¹The two MARTIN 77 values are from a T-matrix pole and from a Breit-Wigner fit.
²The 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

ZHANG	13A	PR C88 035205	H. Zhang <i>et al.</i>	(KSU)
PDG	82	PL 111B 1	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		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		NP B126 266	B.R. Martin, M.K. Pidcock	(LOUC)
Also		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+)
