$\Lambda(1820)$ BRANCHING RATIOS

Errors quoted do not include uncertainties in the parametrizations used in the partial-wave analyses and are thus too small. See also "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
0.55 to 0.65 OUR ESTIMATE				
0.58 ± 0.02	GOPAL	80	DPWA	$\overline{K}N \to \overline{K}N$
0.60 ± 0.03	ALSTON-...	78	DPWA	$\overline{K}N \to \overline{K}N$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.51	DECLAIS	77	DPWA	$\overline{K}N \to \overline{K}N$
0.57 ± 0.02	GOPAL	77	DPWA	See GOPAL 80
0.59 or 0.58	[1] MARTIN	77	DPWA	$\overline{K}N$ multichannel

$(\Gamma_i\Gamma_f)^{1/2}/\Gamma_{total}$ in $N\overline{K} \to \Lambda(1820) \to \Sigma\pi$ — $(\Gamma_1\Gamma_2)^{1/2}/\Gamma$

VALUE	DOCUMENT ID		TECN	COMMENT
-0.28 ± 0.03	GOPAL	77	DPWA	$\overline{K}N$ multichannel
-0.28 ± 0.01	KANE	74	DPWA	$K^-p \to \Sigma\pi$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
-0.25 or -0.25	[1] MARTIN	77	DPWA	$\overline{K}N$ multichannel

$(\Gamma_i\Gamma_f)^{1/2}/\Gamma_{total}$ in $N\overline{K} \to \Lambda(1820) \to \Lambda\eta$ — $(\Gamma_1\Gamma_6)^{1/2}/\Gamma$

VALUE	DOCUMENT ID		TECN
$-0.096^{+0.040}_{-0.020}$	RADER	73	MPWA

$\Gamma(\Sigma\pi\pi)/\Gamma_{total}$ — Γ_7/Γ

VALUE	DOCUMENT ID		TECN	COMMENT
no clear signal	[2] ARMENTEROS	68C	HDBC	$K^-N \to \Sigma\pi\pi$

$(\Gamma_i\Gamma_f)^{1/2}/\Gamma_{total}$ in $N\overline{K} \to \Lambda(1820) \to \Sigma(1385)\pi$, P-wave — $(\Gamma_1\Gamma_4)^{1/2}/\Gamma$

VALUE	DOCUMENT ID		TECN	COMMENT
-0.167 ± 0.054	[3] CAMERON	78	DPWA	$K^-p \to \Sigma(1385)\pi$
$+0.27\pm0.03$	PREVOST	74	DPWA	$K^-N \to \Sigma(1385)\pi$

$(\Gamma_i\Gamma_f)^{1/2}/\Gamma_{total}$ in $N\overline{K} \to \Lambda(1820) \to \Sigma(1385)\pi$, F-wave — $(\Gamma_1\Gamma_5)^{1/2}/\Gamma$

VALUE	DOCUMENT ID		TECN	COMMENT
$+0.065\pm0.029$	[3] CAMERON	78	DPWA	$K^-p \to \Sigma(1385)\pi$

$\Lambda(1820)$ FOOTNOTES

[1] The two MARTIN 77 values are from a T-matrix pole and from a Breit-Wigner fit.
[2] There is a suggestion of a bump, enough to be consistent with what is expected from $\Sigma(1385) \to \Sigma\pi$ decay.
[3] The published sign has been changed to be in accord with the baryon-first convention.

$\Lambda(1820)$ 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
DECLAIS	77	CERN 77-16	+Duchon, Louvel, Patry, Seguinot+	(CAEN, CERN) 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)
ARMENTEROS	68C	NP B8 216	+Baillon+	(CERN, HEID, SACL) I

$\Lambda(1830)$ 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	$\overline{K}N \to \overline{K}N$
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

$\Lambda(1830)$ WIDTH

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

$\Lambda(1830)$ 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.

$\Lambda(1830)$ 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	$\overline{K}N \to \overline{K}N$
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

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

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

VALUE	DOCUMENT ID		TECN
-0.044 ± 0.020	RADER	73	MPWA

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

VALUE	DOCUMENT ID		TECN	COMMENT
$+0.141\pm0.014$	[2] CAMERON	78	DPWA	$K^-p \to \Sigma(1385)\pi$
$+0.13\pm0.03$	PREVOST	74	DPWA	$K^-N \to \Sigma(1385)\pi$

$\Lambda(1830)$ 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	Roos, Porter, Aguilar-Benitez+	(HELS, CIT, CERN)
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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)