# $\Lambda(1830)$ $D_{05}$

$I(J^P) = 0(\frac{5}{2}^-)$ 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 ($\Gamma_i/\Gamma$) |
|---|---|---|
| $\Gamma_1$ | $N\overline{K}$ | 3–10 % |
| $\Gamma_2$ | $\Sigma\pi$ | 35–75 % |
| $\Gamma_3$ | $\Sigma(1385)\pi$ | >15 % |
| $\Gamma_4$ | $\Sigma(1385)\pi$, $D$-wave | |
| $\Gamma_5$ | $\Lambda\eta$ | |

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 $\Lambda$ and $\Sigma$ Resonances.

### $\Gamma(N\overline{K})/\Gamma_{\text{total}}$ $\Gamma_1/\Gamma$

| 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±0.014 | [2] CAMERON | 78 | DPWA | $K^-p \to \Sigma(1385)\pi$ |
| +0.13 ±0.03 | PREVOST | 74 | DPWA | $K^-N \to \Sigma(1385)\pi$ |

## 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 | M. Roos *et al.* | (HELS, CIT, CERN) |
| GOPAL | 80 | Toronto Conf. 159 | G.P. Gopal | (RHEL) IJP |
| ALSTON-... | 78 | PR D18 182 | M. Alston-Garnjost *et al.* | (LBL, MTHO+) IJP |
| Also | 77 | PRL 38 1007 | M. Alston-Garnjost *et al.* | (LBL, MTHO+) IJP |
| CAMERON | 78 | NP B143 189 | W. Cameron *et al.* | (RHEL, LOIC) IJP |
| GOPAL | 77 | NP B119 362 | G.P. Gopal *et al.* | (LOIC, RHEL) IJP |
| MARTIN | 77 | NP B127 349 | B.R. Martin, M.K. Pidcock, R.G. Moorhouse | (LOUC+) IJP |
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| KANE | 74 | LBL-2452 | D.F. Kane | (LBL) IJP |
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| RADER | 73 | NC 16A 178 | R.K. Rader *et al.* | (SACL, HEID, CERN+) |