

$\Lambda(1890) P_{03}$

$$I(J^P) = 0(\frac{3}{2}^+) \text{ Status: } ****$$

For results published before 1974 (they are now obsolete), see our 1982 edition Physics Letters **111B** 1 (1982).

The $J^P = 3/2^+$ assignment is consistent with all available data (including polarization) and recent partial-wave analyses. The dominant inelastic modes remain unknown.

$\Lambda(1890)$ MASS

| VALUE (MeV) | DOCUMENT ID | TECN | COMMENT |
|-------------------------------------------------------------------------------|------------------------|------|----------------------------------------|
| 1850 to 1910 (\approx 1890) OUR ESTIMATE | | | |
| 1897 \pm 5 | GOPAL | 80 | DPWA $\bar{K}N \rightarrow \bar{K}N$ |
| 1908 \pm 10 | ALSTON-... | 78 | DPWA $\bar{K}N \rightarrow \bar{K}N$ |
| 1900 \pm 5 | GOPAL | 77 | DPWA $\bar{K}N$ multichannel |
| 1894 \pm 10 | HEMINGWAY | 75 | DPWA $K^- p \rightarrow \bar{K}N$ |
| ● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ● | | | |
| 1856 or 1868 | ¹ MARTIN | 77 | DPWA $\bar{K}N$ multichannel |
| 1900 | ² NAKKASYAN | 75 | DPWA $K^- p \rightarrow \Lambda\omega$ |

$\Lambda(1890)$ WIDTH

| VALUE (MeV) | DOCUMENT ID | TECN | COMMENT |
|-------------------------------------------------------------------------------|------------------------|------|----------------------------------------|
| 60 to 200 (\approx 100) OUR ESTIMATE | | | |
| 74 \pm 10 | GOPAL | 80 | DPWA $\bar{K}N \rightarrow \bar{K}N$ |
| 119 \pm 20 | ALSTON-... | 78 | DPWA $\bar{K}N \rightarrow \bar{K}N$ |
| 72 \pm 10 | GOPAL | 77 | DPWA $\bar{K}N$ multichannel |
| 107 \pm 10 | HEMINGWAY | 75 | DPWA $K^- p \rightarrow \bar{K}N$ |
| ● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ● | | | |
| 191 or 193 | ¹ MARTIN | 77 | DPWA $\bar{K}N$ multichannel |
| 100 | ² NAKKASYAN | 75 | DPWA $K^- p \rightarrow \Lambda\omega$ |

$\Lambda(1890)$ DECAY MODES

| Mode | Fraction (Γ_i/Γ) |
|---------------------------------------------------------|--------------------------------|
| Γ_1 $N\bar{K}$ | 20–35 % |
| Γ_2 $\Sigma\pi$ | 3–10 % |
| Γ_3 $\Sigma(1385)\pi$ | seen |
| Γ_4 $\Sigma(1385)\pi$, <i>P</i> -wave | |
| Γ_5 $\Sigma(1385)\pi$, <i>F</i> -wave | |
| Γ_6 $N\bar{K}^*(892)$ | seen |
| Γ_7 $N\bar{K}^*(892)$, $S=1/2$, <i>P</i> -wave | |
| Γ_8 $\Lambda\omega$ | |

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

$\Lambda(1890)$ 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> |
|-------------------------------------------------------------------------------|---------------------|-------------|--------------------------------------|
| 0.20 to 0.35 OUR ESTIMATE | | | |
| 0.20±0.02 | GOPAL | 80 | DPWA $\bar{K}N \rightarrow \bar{K}N$ |
| 0.34±0.05 | ALSTON-... | 78 | DPWA $\bar{K}N \rightarrow \bar{K}N$ |
| 0.24±0.04 | HEMINGWAY | 75 | DPWA $K^-p \rightarrow \bar{K}N$ |
| • • • We do not use the following data for averages, fits, limits, etc. • • • | | | |
| 0.18±0.02 | GOPAL | 77 | DPWA See GOPAL 80 |
| 0.36 or 0.34 | ¹ MARTIN | 77 | DPWA $\bar{K}N$ multichannel |

$(\Gamma_i\Gamma_f)^{1/2}/\Gamma_{\text{total}}$ in $N\bar{K} \rightarrow \Lambda(1890) \rightarrow \Sigma\pi$ $(\Gamma_1\Gamma_2)^{1/2}/\Gamma$

| <u>VALUE</u> | <u>DOCUMENT ID</u> | <u>TECN</u> | <u>COMMENT</u> |
|-------------------------------------------------------------------------------|---------------------|-------------|------------------------------|
| -0.09±0.03 | GOPAL | 77 | DPWA $\bar{K}N$ multichannel |
| • • • We do not use the following data for averages, fits, limits, etc. • • • | | | |
| +0.15 or +0.14 | ¹ MARTIN | 77 | DPWA $\bar{K}N$ multichannel |

$(\Gamma_i\Gamma_f)^{1/2}/\Gamma_{\text{total}}$ in $N\bar{K} \rightarrow \Lambda(1890) \rightarrow \Lambda\omega$ $(\Gamma_1\Gamma_8)^{1/2}/\Gamma$

| <u>VALUE</u> | <u>DOCUMENT ID</u> | <u>TECN</u> | <u>COMMENT</u> |
|--------------|------------------------|-------------|---------------------------------------|
| seen | BACCARI | 77 | IPWA $K^-p \rightarrow \Lambda\omega$ |
| 0.032 | ² NAKKASYAN | 75 | DPWA $K^-p \rightarrow \Lambda\omega$ |

$(\Gamma_i\Gamma_f)^{1/2}/\Gamma_{\text{total}}$ in $N\bar{K} \rightarrow \Lambda(1890) \rightarrow \Sigma(1385)\pi$, *P-wave* $(\Gamma_1\Gamma_4)^{1/2}/\Gamma$

| <u>VALUE</u> | <u>DOCUMENT ID</u> | <u>TECN</u> | <u>COMMENT</u> |
|--------------|--------------------|-------------|-----------------------------------------|
| <0.03 | CAMERON | 78 | DPWA $K^-p \rightarrow \Sigma(1385)\pi$ |

$(\Gamma_i\Gamma_f)^{1/2}/\Gamma_{\text{total}}$ in $N\bar{K} \rightarrow \Lambda(1890) \rightarrow \Sigma(1385)\pi$, *F-wave* $(\Gamma_1\Gamma_5)^{1/2}/\Gamma$

| <u>VALUE</u> | <u>DOCUMENT ID</u> | <u>TECN</u> | <u>COMMENT</u> |
|--------------|----------------------|-------------|-----------------------------------------|
| -0.126±0.055 | ³ CAMERON | 78 | DPWA $K^-p \rightarrow \Sigma(1385)\pi$ |

$(\Gamma_i\Gamma_f)^{1/2}/\Gamma_{\text{total}}$ in $N\bar{K} \rightarrow \Lambda(1890) \rightarrow N\bar{K}^*(892)$ $(\Gamma_1\Gamma_6)^{1/2}/\Gamma$

| <u>VALUE</u> | <u>DOCUMENT ID</u> | <u>TECN</u> | <u>COMMENT</u> |
|--------------|------------------------|-------------|------------------------------------|
| -0.07±0.03 | ^{3,4} CAMERON | 78B | DPWA $K^-p \rightarrow N\bar{K}^*$ |

$\Lambda(1890)$ FOOTNOTES

- ¹ The two MARTIN 77 values are from a T-matrix pole and from a Breit-Wigner fit.
- ² Found in one of two best solutions.
- ³ The published sign has been changed to be in accord with the baryon-first convention.
- ⁴ Upper limits on the P_3 and F_3 waves are each 0.03.

$\Lambda(1890)$ REFERENCES

| | | | | |
|------------|-----|-------------------|-------------------------------------------|-------------------------|
| 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 |
| CAMERON | 78B | NP B146 327 | W. Cameron <i>et al.</i> | (RHEL, LOIC) IJP |
| BACCARI | 77 | NC 41A 96 | B. Baccari <i>et al.</i> | (SACL, CDEF) 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 |
| HEMINGWAY | 75 | NP B91 12 | R.J. Hemingway <i>et al.</i> | (CERN, HEIDH, MPIM) IJP |
| NAKKASYAN | 75 | NP B93 85 | A. Nakkasyan | (CERN) IJP |
