

$\Lambda(1890) \ 3/2^+$  $I(J^P) = 0(\frac{3}{2}^+)$  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
<b>1850 to 1910 (<math>\approx 1890</math>) OUR ESTIMATE</b>			
$1897 \pm 5$	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	<sup>1</sup> MARTIN	77	DPWA $\bar{K}N$ multichannel
1900	<sup>2</sup> NAKKASYAN	75	DPWA $K^- p \rightarrow \Lambda\omega$

 **$\Lambda(1890)$  WIDTH**

VALUE (MeV)	DOCUMENT ID	TECN	COMMENT
<b>60 to 200 (<math>\approx 100</math>) OUR ESTIMATE</b>			
$74 \pm 10$	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	<sup>1</sup> MARTIN	77	DPWA $\bar{K}N$ multichannel
100	<sup>2</sup> NAKKASYAN	75	DPWA $K^- p \rightarrow \Lambda\omega$

 **$\Lambda(1890)$  DECAY MODES**

Mode	Fraction ( $\Gamma_i/\Gamma$ )
$\Gamma_1 \ N\bar{K}$	20–35 %
$\Gamma_2 \ \Sigma\pi$	3–10 %
$\Gamma_3 \ \Sigma(1385)\pi$	seen
$\Gamma_4 \ \Sigma(1385)\pi, P\text{-wave}$	
$\Gamma_5 \ \Sigma(1385)\pi, F\text{-wave}$	
$\Gamma_6 \ N\bar{K}^*(892)$	seen
$\Gamma_7 \ N\bar{K}^*(892), S=1/2, P\text{-wave}$	
$\Gamma_8 \ \Lambda\omega$	

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  $\Lambda$  and  $\Sigma$  Resonances.

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

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>0.20 to 0.35 OUR ESTIMATE</b>			
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	<sup>1</sup> 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	<sup>1</sup> 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	<sup>2</sup> 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	<sup>3</sup> 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	<sup>3,4</sup> CAMERON	78B	DPWA $K^-p \rightarrow N\bar{K}^*$

### $\Lambda(1890)$ FOOTNOTES

- <sup>1</sup> The two MARTIN 77 values are from a T-matrix pole and from a Breit-Wigner fit.
- <sup>2</sup> Found in one of two best solutions.
- <sup>3</sup> The published sign has been changed to be in accord with the baryon-first convention.
- <sup>4</sup> 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

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