

$\Lambda(2110) \ 5/2^+$ $I(J^P) = 0(\frac{5}{2}^+)$ Status: ***

For results published before 1974 (they are now obsolete), see our 1982 edition Physics Letters **111B** 1 (1982). All the references have been retained.

This resonance is in the Baryon Summary Table, but the evidence for it could be better.

 $\Lambda(2110)$ MASS

<u>VALUE (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
2090 to 2140 (\approx 2110) OUR ESTIMATE			
2092 \pm 25	GOPAL	80	DPWA $\bar{K}N \rightarrow \bar{K}N$
2125 \pm 25	CAMERON	78B	DPWA $K^-p \rightarrow N\bar{K}^*$
2106 \pm 50	DEBELLEFON	78	DPWA $\bar{K}N \rightarrow \bar{K}N$
2140 \pm 20	DEBELLEFON	77	DPWA $K^-p \rightarrow \Sigma\pi$
2100 \pm 50	GOPAL	77	DPWA $\bar{K}N$ multichannel
2112 \pm 7	KANE	74	DPWA $K^-p \rightarrow \Sigma\pi$
• • • We do not use the following data for averages, fits, limits, etc. • • •			
2137	BACCARI	77	DPWA $K^-p \rightarrow \Lambda\omega$
2103	¹ NAKKASYAN	75	DPWA $K^-p \rightarrow \Lambda\omega$

 $\Lambda(2110)$ WIDTH

<u>VALUE (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
150 to 250 (\approx 200) OUR ESTIMATE			
245 \pm 25	GOPAL	80	DPWA $\bar{K}N \rightarrow \bar{K}N$
160 \pm 30	CAMERON	78B	DPWA $K^-p \rightarrow N\bar{K}^*$
251 \pm 50	DEBELLEFON	78	DPWA $\bar{K}N \rightarrow \bar{K}N$
140 \pm 20	DEBELLEFON	77	DPWA $K^-p \rightarrow \Sigma\pi$
200 \pm 50	GOPAL	77	DPWA $\bar{K}N$ multichannel
190 \pm 30	KANE	74	DPWA $K^-p \rightarrow \Sigma\pi$
• • • We do not use the following data for averages, fits, limits, etc. • • •			
132	BACCARI	77	DPWA $K^-p \rightarrow \Lambda\omega$
391	¹ NAKKASYAN	75	DPWA $K^-p \rightarrow \Lambda\omega$

 $\Lambda(2110)$ DECAY MODES

Mode	Fraction (Γ_i/Γ)
Γ_1 $N\bar{K}$	5–25 %
Γ_2 $\Sigma\pi$	10–40 %
Γ_3 $\Lambda\omega$	seen

Γ_4	$\Sigma(1385)\pi$	seen
Γ_5	$\Sigma(1385)\pi$, <i>P</i> -wave	
Γ_6	$N\bar{K}^*(892)$	10–60 %
Γ_7	$N\bar{K}^*(892)$, <i>S</i> =1/2, <i>F</i> -wave	

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

$\Lambda(2110)$ 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>
0.05 to 0.25 OUR ESTIMATE			
0.07 ± 0.03	GOPAL	80	DPWA $\bar{K}N \rightarrow \bar{K}N$
0.27 ± 0.06	² DEBELLEFON	78	DPWA $\bar{K}N \rightarrow \bar{K}N$
• • • We do not use the following data for averages, fits, limits, etc. • • •			
0.07 ± 0.03	GOPAL	77	DPWA See GOPAL 80

$(\Gamma_i\Gamma_f)^{1/2}/\Gamma_{\text{total}}$ in $N\bar{K} \rightarrow \Lambda(2110) \rightarrow \Sigma\pi$ $(\Gamma_1\Gamma_2)^{1/2}/\Gamma$

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
$+0.14 \pm 0.01$	DEBELLEFON	77	DPWA $K^-p \rightarrow \Sigma\pi$
$+0.20 \pm 0.03$	KANE	74	DPWA $K^-p \rightarrow \Sigma\pi$
• • • We do not use the following data for averages, fits, limits, etc. • • •			
$+0.10 \pm 0.03$	GOPAL	77	DPWA $\bar{K}N$ multichannel

$(\Gamma_i\Gamma_f)^{1/2}/\Gamma_{\text{total}}$ in $N\bar{K} \rightarrow \Lambda(2110) \rightarrow \Lambda\omega$ $(\Gamma_1\Gamma_3)^{1/2}/\Gamma$

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<0.05	BACCARI	77	DPWA $K^-p \rightarrow \Lambda\omega$
0.112	¹ NAKKASYAN	75	DPWA $K^-p \rightarrow \Lambda\omega$

$(\Gamma_i\Gamma_f)^{1/2}/\Gamma_{\text{total}}$ in $N\bar{K} \rightarrow \Lambda(2110) \rightarrow \Sigma(1385)\pi$ $(\Gamma_1\Gamma_4)^{1/2}/\Gamma$

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
$+0.071 \pm 0.025$	³ CAMERON	78	DPWA $K^-p \rightarrow \Sigma(1385)\pi$

$(\Gamma_i\Gamma_f)^{1/2}/\Gamma_{\text{total}}$ in $N\bar{K} \rightarrow \Lambda(2110) \rightarrow N\bar{K}^*(892)$ $(\Gamma_1\Gamma_6)^{1/2}/\Gamma$

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
-0.17 ± 0.04	⁴ CAMERON	78B	DPWA $K^-p \rightarrow N\bar{K}^*$

$\Lambda(2110)$ FOOTNOTES

- ¹ Found in one of two best solutions.
- ² The published error of 0.6 was a misprint.
- ³ The CAMERON 78 upper limit on *F*-wave decay is 0.03. The sign here has been changed to be in accord with the baryon-first convention.
- ⁴ The published sign has been changed to be in accord with the baryon-first convention. The CAMERON 78B upper limits on the P_3 and F_3 waves are each 0.03.

$\Lambda(2110)$ 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
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
DEBELLEFON	78	NC 42A 403	A. de Bellefon <i>et al.</i>	(CDEF, SACL) IJP
BACCARI	77	NC 41A 96	B. Baccari <i>et al.</i>	(SACL, CDEF) IJP
DEBELLEFON	77	NC 37A 175	A. de Bellefon <i>et al.</i>	(CDEF, SACL) IJP
GOPAL	77	NP B119 362	G.P. Gopal <i>et al.</i>	(LOIC, RHEL) IJP
NAKKASYAN	75	NP B93 85	A. Nakkasyan	(CERN) IJP
KANE	74	LBL-2452	D.F. Kane	(LBL) IJP
