# $\Lambda(2350)$ $H_{09}$

$I(J^P) = 0(\frac{9}{2}^+)$ Status: ***

DAUM 68 favors $J^P = 7/2^-$ or $9/2^+$. BRICMAN 70 favors $9/2^+$. LASINSKI 71 suggests three states in this region using a Pomeron + resonances model. There are now also three formation experiments from the College de France-Saclay group, DEBELLEFON 77, BACCARI 77, and DEBELLEFON 78, which find $9/2^+$ in energy-dependent partial-wave analyses of $\overline{K}N \rightarrow \Sigma\pi$, $\Lambda\omega$, and $N\overline{K}$.

## $\Lambda(2350)$ MASS

| *VALUE* (MeV) | *DOCUMENT ID* | | *TECN* | *COMMENT* |
|---|---|---|---|---|
| **2340 to 2370 (≈ 2350) OUR ESTIMATE** | | | | |
| 2370 ± 50 | DEBELLEFON | 78 | DPWA | $\overline{K}N \rightarrow \overline{K}N$ |
| 2365 ± 20 | DEBELLEFON | 77 | DPWA | $K^-p \rightarrow \Sigma\pi$ |
| 2358 ± 6 | BRICMAN | 70 | CNTR | Total, charge exchange |
| • • • We do not use the following data for averages, fits, limits, etc. • • • | | | | |
| 2372 | BACCARI | 77 | DPWA | $K^-p \rightarrow \Lambda\omega$ |
| 2344 ± 15 | COOL | 70 | CNTR | $K^-p$, $K^-d$ total |
| 2360 ± 20 | LU | 70 | CNTR | $\gamma p \rightarrow K^+Y^*$ |
| 2340 ± 7 | BUGG | 68 | CNTR | $K^-p$, $K^-d$ total |

## $\Lambda(2350)$ WIDTH

| *VALUE* (MeV) | *DOCUMENT ID* | | *TECN* | *COMMENT* |
|---|---|---|---|---|
| **100 to 250 (≈ 150) OUR ESTIMATE** | | | | |
| 204 ± 50 | DEBELLEFON | 78 | DPWA | $\overline{K}N \rightarrow \overline{K}N$ |
| 110 ± 20 | DEBELLEFON | 77 | DPWA | $K^-p \rightarrow \Sigma\pi$ |
| 324 ± 30 | BRICMAN | 70 | CNTR | Total, charge exchange |
| • • • We do not use the following data for averages, fits, limits, etc. • • • | | | | |
| 257 | BACCARI | 77 | DPWA | $K^-p \rightarrow \Lambda\omega$ |
| 190 | COOL | 70 | CNTR | $K^-p$, $K^-d$ total |
| 55 | LU | 70 | CNTR | $\gamma p \rightarrow K^+Y^*$ |
| 140 ± 20 | BUGG | 68 | CNTR | $K^-p$, $K^-d$ total |

## $\Lambda(2350)$ DECAY MODES

| | Mode | Fraction ($\Gamma_i/\Gamma$) |
|---|---|---|
| $\Gamma_1$ | $N\overline{K}$ | ~ 12 % |
| $\Gamma_2$ | $\Sigma\pi$ | ~ 10 % |
| $\Gamma_3$ | $\Lambda\omega$ | |

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

## $\Lambda(2350)$ BRANCHING RATIOS

See "Sign conventions for resonance couplings" in the Note on $\Lambda$ and $\Sigma$ Resonances.

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

| VALUE | DOCUMENT ID | TECN | COMMENT |
|---|---|---|---|
| **~ 0.12 OUR ESTIMATE** | | | |
| $0.12 \pm 0.04$ | DEBELLEFON 78 | DPWA | $\overline{K}N \rightarrow \overline{K}N$ |

**$(\Gamma_i\Gamma_f)^{1/2}/\Gamma_{total}$ in $N\overline{K} \rightarrow \Lambda(2350) \rightarrow \Sigma\pi$** **$(\Gamma_1\Gamma_2)^{1/2}/\Gamma$**

| VALUE | DOCUMENT ID | TECN | COMMENT |
|---|---|---|---|
| $-0.11 \pm 0.02$ | DEBELLEFON 77 | DPWA | $K^- p \rightarrow \Sigma\pi$ |

**$(\Gamma_i\Gamma_f)^{1/2}/\Gamma_{total}$ in $N\overline{K} \rightarrow \Lambda(2350) \rightarrow \Lambda\omega$** **$(\Gamma_1\Gamma_3)^{1/2}/\Gamma$**

| VALUE | DOCUMENT ID | TECN | COMMENT |
|---|---|---|---|
| $<0.05$ | BACCARI 77 | DPWA | $K^- p \rightarrow \Lambda\omega$ |

## $\Lambda(2350)$ REFERENCES


| | | | | |
|---|---|---|---|---|
| DEBELLEFON | 78 | NC 42A 403 | A. de Bellefon *et al.* | (CDEF, SACL) IJP |
| BACCARI | 77 | NC 41A 96 | B. Baccari *et al.* | (SACL, CDEF) IJP |
| DEBELLEFON | 77 | NC 37A 175 | A. de Bellefon *et al.* | (CDEF, SACL) IJP |
| LASINSKI | 71 | NP B29 125 | T.A. Lasinski | (EFI) IJP |
| BRICMAN | 70 | PL 31B 152 | C. Bricman *et al.* | (CERN, CAEN, SACL) |
| COOL | 70 | PR D1 1887 | R.L. Cool *et al.* | (BNL) I |
| Also | 66 | PRL 16 1228 | R.L. Cool *et al.* | (BNL) I |
| LU | 70 | PR D2 1846 | D.C. Lu *et al.* | (YALE) |
| BUGG | 68 | PR 168 1466 | D.V. Bugg *et al.* | (RHEL, BIRM, CAVE) I |
| DAUM | 68 | NP B7 19 | C. Daum *et al.* | (CERN) JP |