# $\Lambda(1670)\ S_{01}$

$I(J^P) = 0(\frac{1}{2}^-)$ Status: ****

The measurements of the mass, width, and elasticity published before 1974 are now obsolete and have been omitted. They were last listed in our 1982 edition Physics Letters **111B** (1982).

## $\Lambda(1670)$ MASS

| *VALUE* (MeV) | *DOCUMENT ID* | | *TECN* | *COMMENT* |
|---|---|---|---|---|
| **1660 to 1680 (≈ 1670) OUR ESTIMATE** | | | | |
| 1673 ±2 | MANLEY | 02 | DPWA | $\overline{K}N$ multichannel |
| 1670.8±1.7 | KOISO | 85 | DPWA | $K^-p \to \Sigma\pi$ |
| 1667 ±5 | GOPAL | 80 | DPWA | $\overline{K}N \to \overline{K}N$ |
| 1671 ±3 | ALSTON-... | 78 | DPWA | $\overline{K}N \to \overline{K}N$ |
| 1670 ±5 | GOPAL | 77 | DPWA | $\overline{K}N$ multichannel |
| 1675 ±2 | HEPP | 76B | DPWA | $K^-N \to \Sigma\pi$ |
| 1679 ±1 | KANE | 74 | DPWA | $K^-p \to \Sigma\pi$ |
| 1665 ±5 | PREVOST | 74 | DPWA | $K^-N \to \Sigma(1385)\pi$ |
| • • • We do not use the following data for averages, fits, limits, etc. • • • | | | | |
| 1668.9±2.0 | ABAEV | 96 | DPWA | $K^-p \to \Lambda\eta$ |
| 1664 | [1] MARTIN | 77 | DPWA | $\overline{K}N$ multichannel |

## $\Lambda(1670)$ WIDTH

| *VALUE* (MeV) | *DOCUMENT ID* | | *TECN* | *COMMENT* |
|---|---|---|---|---|
| **25 to 50 (≈ 35) OUR ESTIMATE** | | | | |
| 23 ± 6 | MANLEY | 02 | DPWA | $\overline{K}N$ multichannel |
| 34.1± 3.7 | KOISO | 85 | DPWA | $K^-p \to \Sigma\pi$ |
| 29 ± 5 | GOPAL | 80 | DPWA | $\overline{K}N \to \overline{K}N$ |
| 29 ± 5 | ALSTON-... | 78 | DPWA | $\overline{K}N \to \overline{K}N$ |
| 45 ±10 | GOPAL | 77 | DPWA | $\overline{K}N$ multichannel |
| 46 ± 5 | HEPP | 76B | DPWA | $K^-N \to \Sigma\pi$ |
| 40 ± 3 | KANE | 74 | DPWA | $K^-p \to \Sigma\pi$ |
| 19 ± 5 | PREVOST | 74 | DPWA | $K^-N \to \Sigma(1385)\pi$ |
| • • • We do not use the following data for averages, fits, limits, etc. • • • | | | | |
| 21.1± 3.6 | ABAEV | 96 | DPWA | $K^-p \to \Lambda\eta$ |
| 12 | [1] MARTIN | 77 | DPWA | $\overline{K}N$ multichannel |

## $\Lambda(1670)$ DECAY MODES

| | Mode | Fraction ($\Gamma_i/\Gamma$) |
|---|---|---|
| $\Gamma_1$ | $N\overline{K}$ | 20–30 % |
| $\Gamma_2$ | $\Sigma\pi$ | 25–55 % |
| $\Gamma_3$ | $\Lambda\eta$ | 10–25 % |
| $\Gamma_4$ | $\Sigma(1385)\pi$ | |

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

## $\Lambda(1670)$ 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 |
|---|---|---|---|---|
| **0.20 to 0.30 OUR ESTIMATE** | | | | |
| 0.37±0.07 | MANLEY | 02 | DPWA | $\overline{K}N$ multichannel |
| 0.18±0.03 | GOPAL | 80 | DPWA | $\overline{K}N \rightarrow \overline{K}N$ |
| 0.17±0.03 | ALSTON-... | 78 | DPWA | $\overline{K}N \rightarrow \overline{K}N$ |
| • • • We do not use the following data for averages, fits, limits, etc. • • • | | | | |
| 0.20±0.03 | GOPAL | 77 | DPWA | See GOPAL 80 |
| 0.15 | [1] MARTIN | 77 | DPWA | $\overline{K}N$ multichannel |

### $\Gamma(\Lambda\eta)/\Gamma_{total}$ $\Gamma_3/\Gamma$

| VALUE | DOCUMENT ID | | TECN | COMMENT |
|---|---|---|---|---|
| • • • We do not use the following data for averages, fits, limits, etc. • • • | | | | |
| 0.30±0.08 | ABAEV | 96 | DPWA | $K^-p \rightarrow \Lambda\eta$ |

### $(\Gamma_i\Gamma_f)^{1/2}/\Gamma_{total}$ in $N\overline{K} \rightarrow \Lambda(1670) \rightarrow \Sigma\pi$ $(\Gamma_1\Gamma_2)^{1/2}/\Gamma$

| VALUE | DOCUMENT ID | | TECN | COMMENT |
|---|---|---|---|---|
| −0.38±0.03 | MANLEY | 02 | DPWA | $\overline{K}N$ multichannel |
| −0.26±0.02 | KOISO | 85 | DPWA | $K^-p \rightarrow \Sigma\pi$ |
| −0.31±0.03 | GOPAL | 77 | DPWA | $\overline{K}N$ multichannel |
| −0.29±0.03 | HEPP | 76B | DPWA | $K^-N \rightarrow \Sigma\pi$ |
| −0.23±0.03 | LONDON | 75 | HLBC | $K^-p \rightarrow \Sigma^0\pi^0$ |
| −0.27±0.02 | KANE | 74 | DPWA | $K^-p \rightarrow \Sigma\pi$ |
| • • • We do not use the following data for averages, fits, limits, etc. • • • | | | | |
| −0.13 | [1] MARTIN | 77 | DPWA | $\overline{K}N$ multichannel |

### $(\Gamma_i\Gamma_f)^{1/2}/\Gamma_{total}$ in $N\overline{K} \rightarrow \Lambda(1670) \rightarrow \Lambda\eta$ $(\Gamma_1\Gamma_3)^{1/2}/\Gamma$

| VALUE | DOCUMENT ID | | TECN | COMMENT |
|---|---|---|---|---|
| +0.24±0.04 | MANLEY | 02 | DPWA | $\overline{K}N$ multichannel |
| +0.20±0.05 | BAXTER | 73 | DPWA | $K^-p \rightarrow$ neutrals |
| • • • We do not use the following data for averages, fits, limits, etc. • • • | | | | |
| 0.24 | KIM | 71 | DPWA | K-matrix analysis |
| 0.26 | ARMENTEROS | 69C | HBC | |
| 0.20 or 0.23 | BERLEY | 65 | HBC | |

### $(\Gamma_i\Gamma_f)^{1/2}/\Gamma_{total}$ in $N\overline{K} \rightarrow \Lambda(1670) \rightarrow \Sigma(1385)\pi$ $(\Gamma_1\Gamma_4)^{1/2}/\Gamma$

| VALUE | DOCUMENT ID | | TECN | COMMENT |
|---|---|---|---|---|
| −0.17±0.06 | MANLEY | 02 | DPWA | $\overline{K}N$ multichannel |
| −0.18±0.05 | PREVOST | 74 | DPWA | $K^-N \rightarrow \Sigma(1385)\pi$ |

## $\Lambda(1670)$ FOOTNOTES

[1] MARTIN 77 obtains identical resonance parameters from a T-matrix pole and from a Breit-Wigner fit.

## Λ(1670) REFERENCES


| | | | | | |
|---|---|---|---|---|---|
| MANLEY | 02 | PRL 88 012002 | D.M. Manley *et al.* | (BNL Crystal Ball Collab.) | |
| ABAEV | 96 | PR C53 385 | V.V. Abaev, B.M.K. Nefkens | (UCLA) | |
| KOISO | 85 | NP A433 619 | H. Koiso *et al.* | (TOKY, MASA) | |
| 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 |
| 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 |
| Also | 77B | NP B126 266 | B.R. Martin, M.K. Pidcock | (LOUC) | |
| Also | 77C | NP B126 285 | B.R. Martin, M.K. Pidcock | (LOUC) | IJP |
| HEPP | 76B | PL 65B 487 | V. Hepp *et al.* | (CERN, HEIDH, MPIM) | IJP |
| LONDON | 75 | NP B85 289 | G.W. London *et al.* | (BNL, CERN, EPOL+) | |
| KANE | 74 | LBL-2452 | D.F. Kane | (LBL) | IJP |
| PREVOST | 74 | NP B69 246 | J. Prevost *et al.* | (SACL, CERN, HEID) | |
| BAXTER | 73 | NP B67 125 | D.F. Baxter *et al.* | (OXF) | IJP |
| KIM | 71 | PRL 27 356 | J.K. Kim | (HARV) | IJP |
| Also | 70 | Duke Conf. 161 | J.K. Kim | (HARV) | IJP |
| Hyperon Resonances, 1970 | | | | | |
| ARMENTEROS | 69C | Lund Paper 229 | R. Armenteros *et al.* | (CERN, HEID, SACL) | IJP |
| Values are quoted in LEVI-SETTI 69. | | | | | |
| BERLEY | 65 | PRL 15 641 | D. Berley *et al.* | (BNL) | IJP |