# $\Delta(2000)\ 5/2^+$

$I(J^P) = \frac{3}{2}(\frac{5}{2}^+)$ Status: **

OMITTED FROM SUMMARY TABLE

## Δ(2000) POLE POSITION

### REAL PART

| *VALUE* (MeV) | *DOCUMENT ID* | | *TECN* | *COMMENT* |
|---|---|---|---|---|
| 1998± 4±4 | [1] SVARC | 14 | L+P | $\pi N \to \pi N$ |
| 1976 | SHRESTHA | 12A | DPWA | Multichannel |
| 2150±100 | CUTKOSKY | 80 | IPWA | $\pi N \to \pi N$ |
| • • • We do not use the following data for averages, fits, limits, etc. • • • | | | | |
| 1697 | VRANA | 00 | DPWA | Multichannel |

[1] Fit to the amplitudes of HOEHLER 79.

### −2×IMAGINARY PART

| *VALUE* (MeV) | *DOCUMENT ID* | | *TECN* | *COMMENT* |
|---|---|---|---|---|
| 404± 10±4 | [1] SVARC | 14 | L+P | $\pi N \to \pi N$ |
| 350±100 | CUTKOSKY | 80 | IPWA | $\pi N \to \pi N$ |
| • • • We do not use the following data for averages, fits, limits, etc. • • • | | | | |
| 488 | SHRESTHA | 12A | DPWA | Multichannel |
| 112 | VRANA | 00 | DPWA | Multichannel |

[1] Fit to the amplitudes of HOEHLER 79.

## Δ(2000) ELASTIC POLE RESIDUE

### MODULUS $|r|$

| *VALUE* (MeV) | *DOCUMENT ID* | | *TECN* | *COMMENT* |
|---|---|---|---|---|
| 34±1±1 | [1] SVARC | 14 | L+P | $\pi N \to \pi N$ |
| 16±5 | CUTKOSKY | 80 | IPWA | $\pi N \to \pi N$ |

[1] Fit to the amplitudes of HOEHLER 79.

### PHASE $\theta$

| *VALUE* (°) | *DOCUMENT ID* | | *TECN* | *COMMENT* |
|---|---|---|---|---|
| 110± 1±3 | [1] SVARC | 14 | L+P | $\pi N \to \pi N$ |
| 150±90 | CUTKOSKY | 80 | IPWA | $\pi N \to \pi N$ |

[1] Fit to the amplitudes of HOEHLER 79.

## Δ(2000) BREIT-WIGNER MASS

| *VALUE* (MeV) | *DOCUMENT ID* | | *TECN* | *COMMENT* |
|---|---|---|---|---|
| 2015± 24 | [1] SHRESTHA | 12A | DPWA | Multichannel |
| 2200±125 | CUTKOSKY | 80 | IPWA | $\pi N \to \pi N$ |
| • • • We do not use the following data for averages, fits, limits, etc. • • • | | | | |
| 1724± 61 | VRANA | 00 | DPWA | Multichannel |
| 1752± 32 | MANLEY | 92 | IPWA | $\pi N \to \pi N$ & $N\pi\pi$ |

[1] Statistical error only.

## Δ(2000) BREIT-WIGNER WIDTH

| *VALUE* (MeV) | *DOCUMENT ID* | | *TECN* | *COMMENT* |
|---|---|---|---|---|
| 500± 52 | [1] SHRESTHA | 12A | DPWA | Multichannel |
| 400±125 | CUTKOSKY | 80 | IPWA | $\pi N \to \pi N$ |
| • • • We do not use the following data for averages, fits, limits, etc. • • • | | | | |
| 138± 68 | VRANA | 00 | DPWA | Multichannel |
| 251± 93 | MANLEY | 92 | IPWA | $\pi N \to \pi N$ & $N\pi\pi$ |

[1] Statistical error only.

## Δ(2000) DECAY MODES

| | Mode | Fraction ($\Gamma_i/\Gamma$) |
|---|---|---|
| $\Gamma_1$ | $N\pi$ | 3–11 % |
| $\Gamma_2$ | $N\pi\pi$ | >87 % |
| $\Gamma_3$ | $\Delta(1232)\pi$ | <9 % |
| $\Gamma_4$ | $\Delta(1232)\pi$, *P*-wave | <6 % |
| $\Gamma_5$ | $\Delta(1232)\pi$, *F*-wave | <3 % |
| $\Gamma_6$ | $N\rho$, $S$=3/2, *P*-wave | seen |
| $\Gamma_7$ | $N(1440)\pi$ | |
| $\Gamma_8$ | $N(1520)\pi$, *S*-wave | |
| $\Gamma_9$ | $N(1535)\pi$ | |
| $\Gamma_{10}$ | $N\gamma$ | |
| $\Gamma_{11}$ | $N\gamma$, helicity=1/2 | seen |
| $\Gamma_{12}$ | $N\gamma$, helicity=3/2 | seen |

## Δ(2000) BRANCHING RATIOS

### $\Gamma(N\pi)/\Gamma_{total}$ $\Gamma_1/\Gamma$

| *VALUE* (%) | *DOCUMENT ID* | | *TECN* | *COMMENT* |
|---|---|---|---|---|
| 11±5 | SEIFEN | 25 | DPWA | Multichannel |
| 7±1 | [1] SHRESTHA | 12A | DPWA | Multichannel |
| 7±4 | CUTKOSKY | 80 | IPWA | $\pi N \to \pi N$ |
| • • • We do not use the following data for averages, fits, limits, etc. • • • | | | | |
| 0±1 | VRANA | 00 | DPWA | Multichannel |
| 2±1 | MANLEY | 92 | IPWA | $\pi N \to \pi N$ & $N\pi\pi$ |

[1] Statistical error only.

### $\Gamma(\Delta(1232)\pi, P\text{-wave})/\Gamma_{total}$ $\Gamma_4/\Gamma$

| *VALUE* (%) | *DOCUMENT ID* | | *TECN* | *COMMENT* |
|---|---|---|---|---|
| 14±6 | SEIFEN | 25 | DPWA | Multichannel |
| 3±3 | [1] SHRESTHA | 12A | DPWA | Multichannel |
| • • • We do not use the following data for averages, fits, limits, etc. • • • | | | | |
| 0±1 | VRANA | 00 | DPWA | Multichannel |

[1] Statistical error only.

### $\Gamma(\Delta(1232)\pi, F\text{-wave})/\Gamma_{total}$ $\Gamma_5/\Gamma$

| *VALUE* (%) | *DOCUMENT ID* | | *TECN* | *COMMENT* |
|---|---|---|---|---|
| $3\pm2$ | SEIFEN | 25 | DPWA | Multichannel |
| $< 3$ | SHRESTHA | 12A | DPWA | Multichannel |
| • • • We do not use the following data for averages, fits, limits, etc. • • • | | | | |
| $40\pm1$ | VRANA | 00 | DPWA | Multichannel |

### $\Gamma(N\rho, S{=}3/2, P\text{-wave})/\Gamma_{total}$ $\Gamma_6/\Gamma$

| *VALUE* (%) | *DOCUMENT ID* | | *TECN* | *COMMENT* |
|---|---|---|---|---|
| $90\pm 3$ | [1] SHRESTHA | 12A | DPWA | Multichannel |
| • • • We do not use the following data for averages, fits, limits, etc. • • • | | | | |
| $60\pm60$ | VRANA | 00 | DPWA | Multichannel |

[1] Statistical error only.

### $\Gamma(N(1440)\pi)/\Gamma_{total}$ $\Gamma_7/\Gamma$

| *VALUE* (%) | *DOCUMENT ID* | | *TECN* | *COMMENT* |
|---|---|---|---|---|
| $9\pm6$ | SEIFEN | 25 | DPWA | Multichannel |

### $\Gamma(N(1520)\pi, S\text{-wave})/\Gamma_{total}$ $\Gamma_8/\Gamma$

| *VALUE* (%) | *DOCUMENT ID* | | *TECN* | *COMMENT* |
|---|---|---|---|---|
| $<1$ | SEIFEN | 25 | DPWA | Multichannel |

### $\Gamma(N(1535)\pi)/\Gamma_{total}$ $\Gamma_9/\Gamma$

| *VALUE* (%) | *DOCUMENT ID* | | *TECN* | *COMMENT* |
|---|---|---|---|---|
| $<1$ | SEIFEN | 25 | DPWA | Multichannel |

## $\Delta(2000)$ BREIT-WIGNER PHOTON DECAY AMPLITUDES

### $\Delta(2000) \to p\gamma$, helicity-1/2 amplitude $A_{1/2}$

| *VALUE* ($GeV^{-1/2}$) | *DOCUMENT ID* | | *TECN* | *COMMENT* |
|---|---|---|---|---|
| • • • We do not use the following data for averages, fits, limits, etc. • • • | | | | |
| $-0.061\pm0.018$ | [1] SHRESTHA | 12A | DPWA | Multichannel |

[1] Statistical error only.

### $\Delta(2000) \to p\gamma$, helicity-3/2 amplitude $A_{3/2}$

| *VALUE* ($GeV^{-1/2}$) | *DOCUMENT ID* | | *TECN* | *COMMENT* |
|---|---|---|---|---|
| • • • We do not use the following data for averages, fits, limits, etc. • • • | | | | |
| $0.158\pm0.032$ | [1] SHRESTHA | 12A | DPWA | Multichannel |

[1] Statistical error only.

## $\Delta(2000)$ REFERENCES


| | | | | |
|---|---|---|---|---|
| SEIFEN | 25 | EPJ A61 173 | T. Seifen *et al.* | (CBELSA/TAPS Collab.) |
| SVARC | 14 | PR C89 045205 | A. Svarc *et al.* | (RBI Zagreb, UNI Tuzla) |
| SHRESTHA | 12A | PR C86 055203 | M. Shrestha, D.M. Manley | (KSU) |
| VRANA | 00 | PRPL 328 181 | T.P. Vrana, S.A. Dytman, T.-S.H. Lee | (PITT, ANL) |
| MANLEY | 92 | PR D45 4002 | D.M. Manley, E.M. Saleski | (KSA) IJP |
| Also | | PR D30 904 | D.M. Manley *et al.* | (VPI) |
| CUTKOSKY | 80 | Toronto Conf. 19 | R.E. Cutkosky *et al.* | (CMU, LBL) |
| Also | | PR D20 2839 | R.E. Cutkosky *et al.* | (CMU, LBL) |
| HOEHLER | 79 | PDAT 12-1 | G. Hohler *et al.* | (KARLT) |