# $\Delta(2420)\ 11/2^+$

$I(J^P) = \frac{3}{2}(\frac{11}{2}^+)$ Status: ****

Older and obsolete values are listed and referenced in the 2014 edition, Chinese Physics **C38** 070001 (2014).

## Δ(2420) POLE POSITION

### REAL PART

| *VALUE* (MeV) | *DOCUMENT ID* | | *TECN* | *COMMENT* |
|---|---|---|---|---|
| **2300 to 2500 (≈ 2400) OUR ESTIMATE** | | | | |
| 2454± 4±11 | [1] SVARC | 14 | L+P | $\pi N \to \pi N$ |
| 2360±100 | CUTKOSKY | 80 | IPWA | $\pi N \to \pi N$ |
| • • • We do not use the following data for averages, fits, limits, etc. • • • | | | | |
| 2529 | ARNDT | 06 | DPWA | $\pi N \to \pi N, \eta N$ |
| 2300 | HOEHLER | 93 | ARGD | $\pi N \to \pi N$ |

[1] Fit to the amplitudes of HOEHLER 79.

### −2×IMAGINARY PART

| *VALUE* (MeV) | *DOCUMENT ID* | | *TECN* | *COMMENT* |
|---|---|---|---|---|
| **350 to 550 (≈ 450) OUR ESTIMATE** | | | | |
| 462± 8±50 | [1] SVARC | 14 | L+P | $\pi N \to \pi N$ |
| 420±100 | CUTKOSKY | 80 | IPWA | $\pi N \to \pi N$ |
| • • • We do not use the following data for averages, fits, limits, etc. • • • | | | | |
| 621 | ARNDT | 06 | DPWA | $\pi N \to \pi N, \eta N$ |
| 620 | HOEHLER | 93 | ARGD | $\pi N \to \pi N$ |

[1] Fit to the amplitudes of HOEHLER 79.

## Δ(2420) ELASTIC POLE RESIDUE

### MODULUS $|r|$

| *VALUE* (MeV) | *DOCUMENT ID* | | *TECN* | *COMMENT* |
|---|---|---|---|---|
| **20 to 40 (≈ 30) OUR ESTIMATE** | | | | |
| 30±1±7 | [1] SVARC | 14 | L+P | $\pi N \to \pi N$ |
| 18±6 | CUTKOSKY | 80 | IPWA | $\pi N \to \pi N$ |
| • • • We do not use the following data for averages, fits, limits, etc. • • • | | | | |
| 33 | ARNDT | 06 | DPWA | $\pi N \to \pi N, \eta N$ |
| 39 | HOEHLER | 93 | ARGD | $\pi N \to \pi N$ |

[1] Fit to the amplitudes of HOEHLER 79.

### PHASE $\theta$

| *VALUE* (°) | *DOCUMENT ID* | | *TECN* | *COMMENT* |
|---|---|---|---|---|
| **−60 to 20 (≈ − 20) OUR ESTIMATE** | | | | |
| 11± 1±8 | [1] SVARC | 14 | L+P | $\pi N \to \pi N$ |
| −30±40 | CUTKOSKY | 80 | IPWA | $\pi N \to \pi N$ |
| • • • We do not use the following data for averages, fits, limits, etc. • • • | | | | |
| −45 | ARNDT | 06 | DPWA | $\pi N \to \pi N, \eta N$ |
| −60 | HOEHLER | 93 | ARGD | $\pi N \to \pi N$ |

[1] Fit to the amplitudes of HOEHLER 79.

## Δ(2420) BREIT-WIGNER MASS

| *VALUE* (MeV) | *DOCUMENT ID* | | *TECN* | *COMMENT* |
|---|---|---|---|---|
| **2300 to 2600 (≈ 2450) OUR ESTIMATE** | | | | |
| 2633± 29 | [1] ARNDT | 06 | DPWA | $\pi N \to \pi N, \eta N$ |
| 2400±125 | CUTKOSKY | 80 | IPWA | $\pi N \to \pi N$ |
| 2416± 17 | HOEHLER | 79 | IPWA | $\pi N \to \pi N$ |

[1] Statistical error only.

## Δ(2420) BREIT-WIGNER WIDTH

| *VALUE* (MeV) | *DOCUMENT ID* | | *TECN* | *COMMENT* |
|---|---|---|---|---|
| **300 to 700 (≈ 500) OUR ESTIMATE** | | | | |
| 692± 47 | [1] ARNDT | 06 | DPWA | $\pi N \to \pi N, \eta N$ |
| 450±150 | CUTKOSKY | 80 | IPWA | $\pi N \to \pi N$ |
| 340± 28 | HOEHLER | 79 | IPWA | $\pi N \to \pi N$ |

[1] Statistical error only.

## Δ(2420) DECAY MODES

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

| | Mode | Fraction ($\Gamma_i/\Gamma$) |
|---|---|---|
| $\Gamma_1$ | $N\pi$ | 5–10 % |

## Δ(2420) BRANCHING RATIOS

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

| *VALUE* (%) | *DOCUMENT ID* | | *TECN* | *COMMENT* |
|---|---|---|---|---|
| **5 to 10 (≈ 8) OUR ESTIMATE** | | | | |
| 8.5±0.8 | [1] ARNDT | 06 | DPWA | $\pi N \to \pi N, \eta N$ |
| 8 ±3 | CUTKOSKY | 80 | IPWA | $\pi N \to \pi N$ |
| 8.0±1.5 | HOEHLER | 79 | IPWA | $\pi N \to \pi N$ |

[1] Statistical error only.

## Δ(2420) REFERENCES


| | | | | |
|---|---|---|---|---|
| PDG | 14 | CP C38 070001 | K. Olive *et al.* | (PDG Collab.) |
| SVARC | 14 | PR C89 045205 | A. Svarc *et al.* | (RBI Zagreb, UNI Tuzla) |
| ARNDT | 06 | PR C74 045205 | R.A. Arndt *et al.* | (GWU) |
| HOEHLER | 93 | $\pi N$ Newsletter 9 1 | G. Hohler | (KARL) |
| CUTKOSKY | 80 | Toronto Conf. 19 | R.E. Cutkosky *et al.* | (CMU, LBL) IJP |
| Also | | PR D20 2839 | R.E. Cutkosky *et al.* | (CMU, LBL) |
| HOEHLER | 79 | PDAT 12-1 | G. Hohler *et al.* | (KARLT) IJP |
| Also | | Toronto Conf. 3 | R. Koch | (KARLT) IJP |