

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

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

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

$\Delta(2420)$ POLE POSITION

REAL PART

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

¹ Fit to the amplitudes of HOEHLER 79.

-2xIMAGINARY PART

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

¹ Fit to the amplitudes of HOEHLER 79.

$\Delta(2420)$ ELASTIC POLE RESIDUE

MODULUS $|r|$

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

¹ Fit to the amplitudes of HOEHLER 79.

PHASE θ

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

¹ Fit to the amplitudes of HOEHLER 79.

$\Delta(2420)$ BREIT-WIGNER MASS

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

¹ Statistical error only.

$\Delta(2420)$ BREIT-WIGNER WIDTH

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

¹ Statistical error only.

$\Delta(2420)$ DECAY MODES

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

| Mode | Fraction (Γ_i/Γ) |
|-----------------------|--------------------------------|
| $\Gamma_1 \quad N\pi$ | 5–10 % |

$\Delta(2420)$ BRANCHING RATIOS

| $\Gamma(N\pi)/\Gamma_{\text{total}}$ | DOCUMENT ID | TECN | COMMENT | Γ_1/Γ |
|--|--------------------|------|--|-------------------|
| 5 to 10 (≈ 8) OUR ESTIMATE | | | | |
| 8.5 ± 0.8 | ¹ ARNDT | 06 | DPWA $\pi N \rightarrow \pi N, \eta N$ | |
| 8 ± 3 | CUTKOSKY | 80 | IPWA $\pi N \rightarrow \pi N$ | |
| 8.0 ± 1.5 | HOEHLER | 79 | IPWA $\pi N \rightarrow \pi N$ | |

¹ Statistical error only.

$\Delta(2420)$ REFERENCES

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