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

$I(J^P) = \frac{3}{2}(\frac{11}{2}^+)$ 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. • • •				
• • • 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 θ

VALUE (°)	*DOCUMENT ID*		*TECN*	*COMMENT*
−60 to 20 (≈ − 20) OUR ESTIMATE				
11± 1±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.

Δ(2420) BREIT-WIGNER MASS

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

[1] Statistical error only.

Δ(2420) BREIT-WIGNER WIDTH

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

[1] Statistical error only.

Δ(2420) DECAY MODES

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

	Mode	Fraction (Γ_i/Γ)
Γ_1	$N\pi$	5–10 %

Δ(2420) BRANCHING RATIOS

$\Gamma(N\pi)/\Gamma_{\text{total}}$ Γ_1/Γ

VALUE (%)	*DOCUMENT ID*		*TECN*	*COMMENT*
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 *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	πN 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