

$\Delta(2420) 11/2^+$  $I(J^P) = \frac{3}{2}(\frac{11}{2}^+)$  Status: \*\*\*\*Older and obsolete values are listed and referenced in the 2014 edition, Chinese Physics **C38** 070001 (2014). **$\Delta(2420)$  POLE POSITION****REAL PART**

VALUE (MeV)	DOCUMENT ID	TECN	COMMENT
<b>2300 to 2500 (<math>\approx 2400</math>) OUR ESTIMATE</b>			
$2454 \pm 4 \pm 11$	<sup>1</sup> SVARC	14	L+P $\pi N \rightarrow \pi N$
$2360 \pm 100$	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 $\pi N \rightarrow \pi N$

<sup>1</sup> Fit to the amplitudes of HOEHLER 79.**−2×IMAGINARY PART**

VALUE (MeV)	DOCUMENT ID	TECN	COMMENT
<b>350 to 550 (<math>\approx 450</math>) OUR ESTIMATE</b>			
$462 \pm 8 \pm 50$	<sup>1</sup> SVARC	14	L+P $\pi N \rightarrow \pi N$
$420 \pm 100$	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 $\pi N \rightarrow \pi N$

<sup>1</sup> Fit to the amplitudes of HOEHLER 79. **$\Delta(2420)$  ELASTIC POLE RESIDUE****MODULUS  $|r|$** 

VALUE (MeV)	DOCUMENT ID	TECN	COMMENT
<b>20 to 40 (<math>\approx 30</math>) OUR ESTIMATE</b>			
$30 \pm 1 \pm 7$	<sup>1</sup> SVARC	14	L+P $\pi N \rightarrow \pi N$
$18 \pm 6$	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 $\pi N \rightarrow \pi N$

<sup>1</sup> Fit to the amplitudes of HOEHLER 79.**PHASE  $\theta$** 

VALUE (°)	DOCUMENT ID	TECN	COMMENT
<b>−60 to 20 (<math>\approx -20</math>) OUR ESTIMATE</b>			
$11 \pm 1 \pm 8$	<sup>1</sup> SVARC	14	L+P $\pi N \rightarrow \pi N$
$-30 \pm 40$	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 $\pi N \rightarrow \pi N$

<sup>1</sup> Fit to the amplitudes of HOEHLER 79.

**$\Delta(2420)$  BREIT-WIGNER MASS**

VALUE (MeV)	DOCUMENT ID	TECN	COMMENT
<b>2300 to 2600 (<math>\approx 2450</math>) OUR ESTIMATE</b>			
$2633 \pm 29$	<sup>1</sup> ARNDT	06	DPWA $\pi N \rightarrow \pi N, \eta N$
$2400 \pm 125$	CUTKOSKY	80	IPWA $\pi N \rightarrow \pi N$
$2416 \pm 17$	HOEHLER	79	IPWA $\pi N \rightarrow \pi N$

<sup>1</sup>Statistical error only. **$\Delta(2420)$  BREIT-WIGNER WIDTH**

VALUE (MeV)	DOCUMENT ID	TECN	COMMENT
<b>300 to 700 (<math>\approx 500</math>) OUR ESTIMATE</b>			
$692 \pm 47$	<sup>1</sup> ARNDT	06	DPWA $\pi N \rightarrow \pi N, \eta N$
$450 \pm 150$	CUTKOSKY	80	IPWA $\pi N \rightarrow \pi N$
$340 \pm 28$	HOEHLER	79	IPWA $\pi N \rightarrow \pi N$

<sup>1</sup>Statistical error only. **$\Delta(2420)$  DECAY MODES**

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

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

 **$\Delta(2420)$  BRANCHING RATIOS**

$\Gamma(N\pi)/\Gamma_{\text{total}}$					$\Gamma_1/\Gamma$
VALUE (%)	DOCUMENT ID	TECN	COMMENT		
<b>5 to 10 (<math>\approx 8</math>) OUR ESTIMATE</b>					
$8.5 \pm 0.8$	<sup>1</sup> ARNDT	06	DPWA $\pi N \rightarrow \pi N, \eta N$		
$8 \pm 3$	CUTKOSKY	80	IPWA $\pi N \rightarrow \pi N$		
$8.0 \pm 1.5$	HOEHLER	79	IPWA $\pi N \rightarrow \pi N$		

<sup>1</sup>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	$\pi N$ 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