

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

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

Older and obsolete values are listed and referenced in the 2014 edition, *Chinese Physics C* **38** 070001 (2014).

### $\Delta(2420)$ POLE POSITION

#### REAL PART

VALUE (MeV)	DOCUMENT ID	TECN	COMMENT
<b>2260 to 2400 (<math>\approx</math> 2330) OUR ESTIMATE</b>			
2454 $\pm$ 4 $\pm$ 11	<sup>1</sup> SVARC	14	L+P $\pi N \rightarrow \pi N$
2529	ARNDT	06	DPWA $\pi N \rightarrow \pi N, \eta N$
2300	HOEHLER	93	ARGD $\pi N \rightarrow \pi N$
2360 $\pm$ 100	CUTKOSKY	80	IPWA $\pi N \rightarrow \pi N$

#### - 2xIMAGINARY PART

VALUE (MeV)	DOCUMENT ID	TECN	COMMENT
<b>350 to 750 (<math>\approx</math> 550) OUR ESTIMATE</b>			
462 $\pm$ 8 $\pm$ 50	<sup>1</sup> SVARC	14	L+P $\pi N \rightarrow \pi N$
621	ARNDT	06	DPWA $\pi N \rightarrow \pi N, \eta N$
620	HOEHLER	93	ARGD $\pi N \rightarrow \pi N$
420 $\pm$ 100	CUTKOSKY	80	IPWA $\pi N \rightarrow \pi N$

### $\Delta(2420)$ ELASTIC POLE RESIDUE

#### MODULUS $|r|$

VALUE (MeV)	DOCUMENT ID	TECN	COMMENT
<b>20 to 40 (<math>\approx</math> 30) OUR ESTIMATE</b>			
30 $\pm$ 1 $\pm$ 7	<sup>1</sup> SVARC	14	L+P $\pi N \rightarrow \pi N$
33	ARNDT	06	DPWA $\pi N \rightarrow \pi N, \eta N$
39	HOEHLER	93	ARGD $\pi N \rightarrow \pi N$
18 $\pm$ 6	CUTKOSKY	80	IPWA $\pi N \rightarrow \pi N$

#### PHASE $\theta$

VALUE ( $^\circ$ )	DOCUMENT ID	TECN	COMMENT
<b>- 60 to 20 (<math>\approx</math> - 20) OUR ESTIMATE</b>			
11 $\pm$ 1 $\pm$ 8	<sup>1</sup> SVARC	14	L+P $\pi N \rightarrow \pi N$
- 45	ARNDT	06	DPWA $\pi N \rightarrow \pi N, \eta N$
- 60	HOEHLER	93	ARGD $\pi N \rightarrow \pi N$
- 30 $\pm$ 40	CUTKOSKY	80	IPWA $\pi N \rightarrow \pi N$

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

VALUE (MeV)	DOCUMENT ID	TECN	COMMENT
<b>2300 to 2500 (<math>\approx</math> 2420) OUR ESTIMATE</b>			
2633 $\pm$ 29	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 $\pi N \rightarrow \pi N$

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

<u>VALUE (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>300 to 500 (<math>\approx 400</math>) OUR ESTIMATE</b>			
692 $\pm$ 47	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	$\pi N \rightarrow \pi N$

 **$\Delta(2420)$  DECAY MODES**

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

Mode	Fraction ( $\Gamma_i/\Gamma$ )
$\Gamma_1 \quad N\pi$	5–15 %

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

<u><math>\Gamma(N\pi)/\Gamma_{\text{total}}</math></u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>	<u><math>\Gamma_1/\Gamma</math></u>
<b>5 to 15 OUR ESTIMATE</b>				
8.5 $\pm$ 0.8	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	$\pi N \rightarrow \pi N$	

 **$\Delta(2420)$  FOOTNOTES**

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

 **$\Delta(2420)$  REFERENCES**

PDG	14	CPC 38 070001	K. Olive <i>et al.</i>	(PDG Collab.)
SVARC	14	PR C89 045205	A. Svarc <i>et al.</i>	
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