

# $\Delta(2420) H_{3,11}$

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

Most of the results published before 1975 are now obsolete and have been omitted. They may be found in our 1982 edition, Physics Letters **111B** (1982).

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

VALUE (MeV)	DOCUMENT ID	TECN	COMMENT
<b>2300 to 2500 (<math>\approx 2420</math>) OUR ESTIMATE</b>			
2400 $\pm 125$	CUTKOSKY	80	IPWA $\pi N \rightarrow \pi N$
2416 $\pm 17$	HOEHLER	79	IPWA $\pi N \rightarrow \pi N$
2400 $\pm 60$	HENDRY	78	MPWA $\pi N \rightarrow \pi N$
• • • We do not use the following data for averages, fits, limits, etc. • • •			
2400	CANDLIN	84	DPWA $\pi^+ p \rightarrow \Sigma^+ K^+$
2358.0 $\pm 9.0$	CHEW	80	BPWA $\pi^+ p \rightarrow \pi^+ p$

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

VALUE (MeV)	DOCUMENT ID	TECN	COMMENT
<b>300 to 500 (<math>\approx 400</math>) OUR ESTIMATE</b>			
450 $\pm 150$	CUTKOSKY	80	IPWA $\pi N \rightarrow \pi N$
340 $\pm 28$	HOEHLER	79	IPWA $\pi N \rightarrow \pi N$
460 $\pm 100$	HENDRY	78	MPWA $\pi N \rightarrow \pi N$
• • • We do not use the following data for averages, fits, limits, etc. • • •			
400	CANDLIN	84	DPWA $\pi^+ p \rightarrow \Sigma^+ K^+$
202.2 $\pm 45.0$	CHEW	80	BPWA $\pi^+ p \rightarrow \pi^+ p$

## $\Delta(2420)$ POLE POSITION

### REAL PART

VALUE (MeV)	DOCUMENT ID	TECN	COMMENT
<b>2260 to 2400 (<math>\approx 2330</math>) OUR ESTIMATE</b>			
2300	<sup>1</sup> HOEHLER	93	ARGD $\pi N \rightarrow \pi N$
2360 $\pm 100$	CUTKOSKY	80	IPWA $\pi N \rightarrow \pi N$

### – 2×IMAGINARY PART

VALUE (MeV)	DOCUMENT ID	TECN	COMMENT
<b>350 to 750 (<math>\approx 550</math>) OUR ESTIMATE</b>			
620	<sup>1</sup> 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
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
-60	HOEHLER	93	ARGD $\pi N \rightarrow \pi N$
$-30 \pm 40$	CUTKOSKY	80	IPWA $\pi N \rightarrow \pi N$

## $\Delta(2420)$ DECAY MODES

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

Mode	Fraction ( $\Gamma_j/\Gamma$ )
$\Gamma_1$ $N\pi$	5-15 %
$\Gamma_2$ $\Sigma K$	

## $\Delta(2420)$ BRANCHING RATIOS

$\Gamma(N\pi)/\Gamma_{\text{total}}$	DOCUMENT ID	TECN	COMMENT	$\Gamma_1/\Gamma$
<b>0.05 to 0.15 OUR ESTIMATE</b>				
$0.08 \pm 0.03$	CUTKOSKY	80	IPWA $\pi N \rightarrow \pi N$	
$0.08 \pm 0.015$	HOEHLER	79	IPWA $\pi N \rightarrow \pi N$	
$0.11 \pm 0.02$	HENDRY	78	MPWA $\pi N \rightarrow \pi N$	
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.22	CHEW	80	BPWA $\pi^+ p \rightarrow \pi^+ p$	

$(\Gamma_j \Gamma_f)^{1/2}/\Gamma_{\text{total}}$ in $N\pi \rightarrow \Delta(2420) \rightarrow \Sigma K$	DOCUMENT ID	TECN	COMMENT	$(\Gamma_1 \Gamma_2)^{1/2}/\Gamma$
-0.016	CANDLIN	84	DPWA $\pi^+ p \rightarrow \Sigma^+ K^+$	

## $\Delta(2420)$ FOOTNOTES

<sup>1</sup> See HOEHLER 93 for a detailed discussion of the evidence for and the pole parameters of  $N$  and  $\Delta$  resonances as determined from Argand diagrams of  $\pi N$  elastic partial-wave amplitudes and from plots of the speeds with which the amplitudes traverse the diagrams.

## $\Delta(2420)$ REFERENCES

HOEHLER	93	$\pi N$ Newsletter 9 1	G. Hohler	(KARL)
CANDLIN	84	NP B238 477	D.J. Candlin <i>et al.</i>	(EDIN, RAL, LOWC)
PDG	82	PL 111B	M. Roos <i>et al.</i>	(HELS, CIT, CERN)
CHEW	80	Toronto Conf. 123	D.M. Chew	(LBL) IJP
CUTKOSKY	80	Toronto Conf. 19	R.E. Cutkosky <i>et al.</i>	(CMU, LBL) IJP
Also	79	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	80	Toronto Conf. 3	R. Koch	(KARLT) IJP
HENDRY	78	PRL 41 222	A.W. Hendry	(IND, LBL) IJP
Also	81	ANP 136 1	A.W. Hendry	(IND)