NODE=B084

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

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

NODE=B084

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** 1 (1982).

$\Delta(2420)$ BREIT-WIGNER MASS

NODE=B084205

NODE=B084M

→ NOT CHECKED ←

VALUE (MeV)	*DOCUMENT ID*		*TECN*	*COMMENT*
2300 to 2500 (≈ 2420) OUR ESTIMATE				
2633 ± 29	ARNDT	06	DPWA	$\pi N \to \pi N, \eta N$
2400 ±125	CUTKOSKY	80	IPWA	$\pi N \to \pi N$
2416 ± 17	HOEHLER	79	IPWA	$\pi N \to \pi N$
2400 ± 60	HENDRY	78	MPWA	$\pi N \to \pi N$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
2400	CANDLIN	84	DPWA	$\pi^+ p \to \Sigma^+ K^+$
2358.0± 9.0	CHEW	80	BPWA	$\pi^+ p \to \pi^+ p$

$\Delta(2420)$ BREIT-WIGNER WIDTH

NODE=B084210

NODE=B084W

→ NOT CHECKED ←

VALUE (MeV)	*DOCUMENT ID*		*TECN*	*COMMENT*
300 to 500 (≈ 400) OUR ESTIMATE				
692 ± 47	ARNDT	06	DPWA	$\pi N \to \pi N, \eta N$
450 ±150	CUTKOSKY	80	IPWA	$\pi N \to \pi N$
340 ± 28	HOEHLER	79	IPWA	$\pi N \to \pi N$
460 ±100	HENDRY	78	MPWA	$\pi N \to \pi N$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
400	CANDLIN	84	DPWA	$\pi^+ p \to \Sigma^+ K^+$
202.2± 45.0	CHEW	80	BPWA	$\pi^+ p \to \pi^+ p$

$\Delta(2420)$ POLE POSITION

NODE=B084215

REAL PART

NODE=B084RE

NODE=B084RE

→ NOT CHECKED ←

VALUE (MeV)	*DOCUMENT ID*		*TECN*	*COMMENT*
2260 to 2400 (≈ 2330) OUR ESTIMATE				
2529	ARNDT	06	DPWA	$\pi N \to \pi N, \eta N$
2300	[1] HOEHLER	93	ARGD	$\pi N \to \pi N$
2360±100	CUTKOSKY	80	IPWA	$\pi N \to \pi N$

−2×IMAGINARY PART

NODE=B084IM

NODE=B084IM

→ NOT CHECKED ←

VALUE (MeV)	*DOCUMENT ID*		*TECN*	*COMMENT*
350 to 750 (≈ 550) OUR ESTIMATE				
621	ARNDT	06	DPWA	$\pi N \to \pi N, \eta N$
620	[1] HOEHLER	93	ARGD	$\pi N \to \pi N$
420±100	CUTKOSKY	80	IPWA	$\pi N \to \pi N$

$\Delta(2420)$ ELASTIC POLE RESIDUE

NODE=B084220

MODULUS $|r|$

NODE=B084RER

NODE=B084RER

VALUE (MeV)	*DOCUMENT ID*		*TECN*	*COMMENT*
33	ARNDT	06	DPWA	$\pi N \to \pi N, \eta N$
39	HOEHLER	93	ARGD	$\pi N \to \pi N$
18±6	CUTKOSKY	80	IPWA	$\pi N \to \pi N$

PHASE θ

NODE=B084IMR

NODE=B084IMR

VALUE (°)	*DOCUMENT ID*		*TECN*	*COMMENT*
−45	ARNDT	06	DPWA	$\pi N \to \pi N, \eta N$
−60	HOEHLER	93	ARGD	$\pi N \to \pi N$
−30±40	CUTKOSKY	80	IPWA	$\pi N \to \pi N$

$\Delta(2420)$ DECAY MODES

NODE=B084225;NODE=B084

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

NODE=B084

	Mode	Fraction (Γ_i/Γ)	
Γ_1	$N\pi$	5–15 %	DESIG=1;OUR EST
Γ_2	ΣK		DESIG=2

$\Delta(2420)$ BRANCHING RATIOS

NODE=B084230

$\Gamma(N\pi)/\Gamma_{total}$ Γ_1/Γ

NODE=B084R1
NODE=B084R1

VALUE	DOCUMENT ID		TECN	COMMENT
0.05 to 0.15 OUR ESTIMATE				
0.085±0.008	ARNDT	06	DPWA	$\pi N \to \pi N$, ηN
0.08 ±0.03	CUTKOSKY	80	IPWA	$\pi N \to \pi N$
0.08 ±0.015	HOEHLER	79	IPWA	$\pi N \to \pi N$
0.11 ±0.02	HENDRY	78	MPWA	$\pi N \to \pi N$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.22	CHEW	80	BPWA	$\pi^+ p \to \pi^+ p$

→ NOT CHECKED ←

$(\Gamma_i\Gamma_f)^{1/2}/\Gamma_{total}$ in $N\pi \to \Delta(2420) \to \Sigma K$ $(\Gamma_1\Gamma_2)^{1/2}/\Gamma$

NODE=B084R2
NODE=B084R2

VALUE	DOCUMENT ID		TECN	COMMENT
−0.016	CANDLIN	84	DPWA	$\pi^+ p \to \Sigma^+ K^+$

$\Delta(2420)$ FOOTNOTES

NODE=B084

[1] See HOEHLER 93 for a detailed discussion of the evidence for and the pole parameters of N and Δ resonances as determined from Argand diagrams of πN elastic partial-wave amplitudes and from plots of the speeds with which the amplitudes traverse the diagrams.

NODE=B010;LINKAGE=H9

$\Delta(2420)$ REFERENCES

NODE=B084

ARNDT	06	PR C74 045205	R.A. Arndt *et al.*	(GWU)	REFID=51535
HOEHLER	93	πN Newsletter 9 1	G. Hohler	(KARL)	REFID=43821
CANDLIN	84	NP B238 477	D.J. Candlin *et al.*	(EDIN, RAL, LOWC)	REFID=40339
PDG	82	PL 111B 1	M. Roos *et al.*	(HELS, CIT, CERN)	REFID=41167
CHEW	80	Toronto Conf. 123	D.M. Chew	(LBL) IJP	REFID=31151
CUTKOSKY	80	Toronto Conf. 19	R.E. Cutkosky *et al.*	(CMU, LBL) IJP	REFID=30064
Also		PR D20 2839	R.E. Cutkosky *et al.*	(CMU, LBL)	REFID=40096
HOEHLER	79	PDAT 12-1	G. Hohler *et al.*	(KARLT) IJP	REFID=30058
Also		Toronto Conf. 3	R. Koch	(KARLT) IJP	REFID=30859
HENDRY	78	PRL 41 222	A.W. Hendry	(IND, LBL) IJP	REFID=30893
Also		ANP 136 1	A.W. Hendry	(IND)	REFID=30901