

$\Delta(2400) 9/2^-$  $I(J^P) = \frac{3}{2}(\frac{9}{2}^-)$  Status: \*\*

OMITTED FROM SUMMARY TABLE

 **$\Delta(2400)$  POLE POSITION****REAL PART**

VALUE (MeV)	DOCUMENT ID	TECN	COMMENT
$2458 \pm 2$	ROENCHEN 22	DPWA	Multichannel
$2260 \pm 60$	CUTKOSKY 80	IPWA	$\pi N \rightarrow \pi N$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●			
1931	ROENCHEN 15A	DPWA	Multichannel
1983	ARNDT 06	DPWA	$\pi N \rightarrow \pi N, \eta N$

**–2×IMAGINARY PART**

VALUE (MeV)	DOCUMENT ID	TECN	COMMENT
$280 \pm 2$	ROENCHEN 22	DPWA	Multichannel
$320 \pm 160$	CUTKOSKY 80	IPWA	$\pi N \rightarrow \pi N$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●			
442	ROENCHEN 15A	DPWA	Multichannel
878	ARNDT 06	DPWA	$\pi N \rightarrow \pi N, \eta N$

 **$\Delta(2400)$  ELASTIC POLE RESIDUE****MODULUS  $|r|$** 

VALUE (MeV)	DOCUMENT ID	TECN	COMMENT
$5.4 \pm 2.7$	ROENCHEN 22	DPWA	Multichannel
$8 \pm 4$	CUTKOSKY 80	IPWA	$\pi N \rightarrow \pi N$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●			
13	ROENCHEN 15A	DPWA	Multichannel
24	ARNDT 06	DPWA	$\pi N \rightarrow \pi N, \eta N$

**PHASE  $\theta$** 

VALUE (°)	DOCUMENT ID	TECN	COMMENT
$8.4 \pm 17$	ROENCHEN 22	DPWA	Multichannel
$-25 \pm 15$	CUTKOSKY 80	IPWA	$\pi N \rightarrow \pi N$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●			
$-96$	ROENCHEN 15A	DPWA	Multichannel
$-139$	ARNDT 06	DPWA	$\pi N \rightarrow \pi N, \eta N$

 **$\Delta(2400)$  INELASTIC POLE RESIDUE**The “normalized residue” is the residue divided by  $\Gamma_{pole}/2$ .**Normalized residue in  $N\pi \rightarrow \Delta(2400) \rightarrow \Sigma K$** 

MODULUS	PHASE (°)	DOCUMENT ID	TECN	COMMENT
$0.004 \pm 0.003$	$17 \pm 15$	ROENCHEN 22	DPWA	Multichannel
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●				
0.009	25	ROENCHEN 15A	DPWA	Multichannel

### Normalized residue in $N\pi \rightarrow \Delta(2400) \rightarrow \Delta\pi$ , G-wave

<u>MODULUS</u>	<u>PHASE (<math>^\circ</math>)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
$0.10 \pm 0.05$	$17 \pm 11$	ROENCHEN	22	DPWA Multichannel
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.18	-110	ROENCHEN	15A	DPWA Multichannel

### Normalized residue in $N\pi \rightarrow \Delta(2400) \rightarrow \Delta\pi$ , I-wave

<u>MODULUS</u>	<u>PHASE (<math>^\circ</math>)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
$0.019 \pm 0.003$	$-120 \pm 25$	ROENCHEN	22	DPWA Multichannel
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.012	-1.0	ROENCHEN	15A	DPWA Multichannel

### $\Delta(2400)$ BREIT-WIGNER MASS

<u>VALUE (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
$2643 \pm 141$	<sup>1</sup> ARNDT	06	DPWA $\pi N \rightarrow \pi N, \eta N$
$2300 \pm 100$	CUTKOSKY	80	IPWA $\pi N \rightarrow \pi N$
$2468 \pm 50$	HOEHLER	79	IPWA $\pi N \rightarrow \pi N$

<sup>1</sup>Statistical error only.

### $\Delta(2400)$ BREIT-WIGNER WIDTH

<u>VALUE (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
$895 \pm 432$	<sup>2</sup> ARNDT	06	DPWA $\pi N \rightarrow \pi N, \eta N$
$330 \pm 100$	CUTKOSKY	80	IPWA $\pi N \rightarrow \pi N$
$480 \pm 100$	HOEHLER	79	IPWA $\pi N \rightarrow \pi N$

<sup>2</sup>Statistical error only.

### $\Delta(2400)$ DECAY MODES

<u>Mode</u>	<u>Fraction (<math>\Gamma_i/\Gamma</math>)</u>
$\Gamma_1$ $N\pi$	3-9 %

### $\Delta(2400)$ 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>
$6.4 \pm 2.2$	<sup>3</sup> ARNDT	06	DPWA $\pi N \rightarrow \pi N, \eta N$	
$5 \pm 2$	CUTKOSKY	80	IPWA $\pi N \rightarrow \pi N$	
$6 \pm 3$	HOEHLER	79	IPWA $\pi N \rightarrow \pi N$	

<sup>3</sup>Statistical error only.

## $\Delta(2400)$ PHOTON DECAY AMPLITUDES AT THE POLE

### $\Delta(2400) \rightarrow N\gamma$ , helicity-1/2 amplitude $A_{1/2}$

<u>MODULUS (<math>\text{GeV}^{-1/2}</math>)</u>	<u>PHASE (<math>^\circ</math>)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
$0.021 \pm 0.007$	$-67 \pm 12$	ROENCHEN 22	DPWA	Multichannel
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$-0.034$	63	ROENCHEN 15A	DPWA	Multichannel

### $\Delta(2400) \rightarrow N\gamma$ , helicity-3/2 amplitude $A_{3/2}$

<u>MODULUS (<math>\text{GeV}^{-1/2}</math>)</u>	<u>PHASE (<math>^\circ</math>)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
$0.022 \pm 0.007$	$122 \pm 7$	ROENCHEN 22	DPWA	Multichannel
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.054	$-75$	ROENCHEN 15A	DPWA	Multichannel

## $\Delta(2400)$ REFERENCES

ROENCHEN 22	EPJ A58 229	D. Roenchen <i>et al.</i>	(JULI, GWU, BONN+)
ROENCHEN 15A	EPJ A51 70	D. Roenchen <i>et al.</i>	
ARNDT 06	PR C74 045205	R.A. Arndt <i>et al.</i>	(GWU)
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