

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

OMITTED FROM SUMMARY TABLE

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

<u>VALUE (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
2458 ± 2	ROENCHEN 22	DPWA	Multichannel
2260 ± 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

<u>VALUE (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
280 ± 2	ROENCHEN 22	DPWA	Multichannel
320 ± 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 $|r|$**

<u>VALUE (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
5.4 ± 2.7	ROENCHEN 22	DPWA	Multichannel
8 ± 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 θ

<u>VALUE (°)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
8.4 ± 17	ROENCHEN 22	DPWA	Multichannel
– 25 ± 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 RESIDUEThe “normalized residue” is the residue divided by $\Gamma_{pole}/2$.**Normalized residue in $N\pi \rightarrow \Delta(2400) \rightarrow \Sigma K$**

<u>MODULUS</u>	<u>PHASE (°)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
0.004 ± 0.003	17 ± 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 ($^\circ$)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
0.10 ± 0.05	17 ± 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 ($^\circ$)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
0.019 ± 0.003	-120 ± 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 ± 141	¹ ARNDT	06	DPWA $\pi N \rightarrow \pi N, \eta N$
2300 ± 100	CUTKOSKY	80	IPWA $\pi N \rightarrow \pi N$
2468 ± 50	HOEHLER	79	IPWA $\pi N \rightarrow \pi N$

¹Statistical error only. **$\Delta(2400)$ BREIT-WIGNER WIDTH**

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

²Statistical error only. **$\Delta(2400)$ DECAY MODES**

Mode	Fraction (Γ_i/Γ)
Γ_1 $N\pi$	3–9 %

 $\Delta(2400)$ BRANCHING RATIOS

$\Gamma(N\pi)/\Gamma_{\text{total}}$	Γ_1/Γ
<u>VALUE (%)</u>	
6.4 ± 2.2	³ ARNDT
5 ± 2	CUTKOSKY
6 ± 3	HOEHLER

³Statistical error only.

$\Delta(2400)$ PHOTON DECAY AMPLITUDES AT THE POLE **$\Delta(2400) \rightarrow N\gamma$, helicity-1/2 amplitude $A_{1/2}$**

<u>MODULUS ($\text{GeV}^{-1/2}$)</u>	<u>PHASE ($^\circ$)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
0.021 ± 0.007	-67 ± 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 ($\text{GeV}^{-1/2}$)</u>	<u>PHASE ($^\circ$)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
0.022 ± 0.007	122 ± 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