$N(2250)$ $9/2^{-}$

$I(J^P) = \frac{1}{2}(\frac{9}{2}^-)$ Status: ∗∗∗∗

Older and obsolete values are listed and referenced in the 2014 edition, Chinese Physics **C38** 070001 (2014).

N(2250) POLE POSITION

REAL PART

VALUE (MeV)	DOCUMENT ID		TECN	COMMENT
2150 to 2250 (≈ 2200) OUR ESTIMATE				
2157±3±14	[1] SVARC	14	L+P	$\pi N \to \pi N$
2195±45	ANISOVICH	12A	DPWA	Multichannel
2150±50	CUTKOSKY	80	IPWA	$\pi N \to \pi N$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
2062	ROENCHEN	15A	DPWA	Multichannel
2217	ARNDT	06	DPWA	$\pi N \to \pi N$, ηN
2187	HOEHLER	93	SPED	$\pi N \to \pi N$

[1] Fit to the amplitudes of HOEHLER 79.

−2×IMAGINARY PART

VALUE (MeV)	DOCUMENT ID		TECN	COMMENT
350 to 500 (≈ 420) OUR ESTIMATE				
412±7±44	[1] SVARC	14	L+P	$\pi N \to \pi N$
470±50	ANISOVICH	12A	DPWA	Multichannel
360±100	CUTKOSKY	80	IPWA	$\pi N \to \pi N$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
403	ROENCHEN	15A	DPWA	Multichannel
431	ARNDT	06	DPWA	$\pi N \to \pi N$, ηN
388	HOEHLER	93	SPED	$\pi N \to \pi N$

[1] Fit to the amplitudes of HOEHLER 79.

N(2250) ELASTIC POLE RESIDUE

MODULUS |r|

VALUE (MeV)	DOCUMENT ID		TECN	COMMENT
20 to 30 (≈ 25) OUR ESTIMATE				
24 ±1±5	[1] SVARC	14	L+P	$\pi N \to \pi N$
26 ±5	ANISOVICH	12A	DPWA	Multichannel
20 ±6	CUTKOSKY	80	IPWA	$\pi N \to \pi N$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
8.2	ROENCHEN	15A	DPWA	Multichannel
21	ARNDT	06	DPWA	$\pi N \to \pi N$, ηN
21	HOEHLER	93	SPED	$\pi N \to \pi N$

[1] Fit to the amplitudes of HOEHLER 79.

PHASE θ

VALUE (°)	DOCUMENT ID		TECN	COMMENT
−60 to −20 (≈ −40) OUR ESTIMATE				
−62± 1±11	[1] SVARC	14	L+P	$\pi N \to \pi N$
−38±25	ANISOVICH	12A	DPWA	Multichannel
−50±20	CUTKOSKY	80	IPWA	$\pi N \to \pi N$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
−64	ROENCHEN	15A	DPWA	Multichannel
−20	ARNDT	06	DPWA	$\pi N \to \pi N$, ηN

[1] Fit to the amplitudes of HOEHLER 79.

$N(2250)$ INELASTIC POLE RESIDUE

The "normalized residue" is the residue divided by $\Gamma_{pole}/2$.

Normalized residue in $N\pi \to N(2250) \to N\eta$

MODULUS	PHASE (°)	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.017	−89	ROENCHEN	15A	DPWA	Multichannel

Normalized residue in $N\pi \to N(2250) \to \Lambda K$

MODULUS	PHASE (°)	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.006	−101	ROENCHEN	15A	DPWA	Multichannel

Normalized residue in $N\pi \to N(2250) \to \Sigma K$

MODULUS	PHASE (°)	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.002	70	ROENCHEN	15A	DPWA	Multichannel

$N(2250)$ BREIT-WIGNER MASS

VALUE (MeV)	DOCUMENT ID		TECN	COMMENT
2250 to 2320 (≈ 2280) OUR ESTIMATE				
2280±40	ANISOVICH	12A	DPWA	Multichannel
2302± 6	[1] ARNDT	06	DPWA	$\pi N \to \pi N$, ηN
2250±80	CUTKOSKY	80	IPWA	$\pi N \to \pi N$
2268±15	HOEHLER	79	IPWA	$\pi N \to \pi N$

[1] Statistical error only.

$N(2250)$ BREIT-WIGNER WIDTH

VALUE (MeV)	DOCUMENT ID		TECN	COMMENT
300 to 600 (≈ 500) OUR ESTIMATE				
520± 50	ANISOVICH	12A	DPWA	Multichannel
628± 28	[1] ARNDT	06	DPWA	$\pi N \to \pi N$, ηN
480±120	CUTKOSKY	80	IPWA	$\pi N \to \pi N$
300± 40	HOEHLER	79	IPWA	$\pi N \to \pi N$

[1] Statistical error only.

N(2250) DECAY MODES

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

	Mode	Fraction (Γ_i/Γ)
Γ_1	$N\pi$	0.05 to 0.15 ($\approx$ 0.10)

N(2250) BRANCHING RATIOS

$\Gamma(N\pi)/\Gamma_{total}$ — Γ_1/Γ

VALUE (%)	DOCUMENT ID		TECN	COMMENT
5 to 15 ($\approx$ 10) OUR ESTIMATE				
12 ±4	ANISOVICH	12A	DPWA	Multichannel
8.9±0.1	[1] ARNDT	06	DPWA	$\pi N \to \pi N$, ηN
10 ±2	CUTKOSKY	80	IPWA	$\pi N \to \pi N$
10 ±2	HOEHLER	79	IPWA	$\pi N \to \pi N$

[1] Statistical error only.

N(2250) PHOTON DECAY AMPLITUDES AT THE POLE

$N(2250) \to p\gamma$, helicity-1/2 amplitude $A_{1/2}$

MODULUS ($GeV^{-1/2}$)	PHASE (°)	DOCUMENT ID		TECN	COMMENT
$-0.090^{+0.025}_{-0.022}$	-49^{+17}_{-11}	ROENCHEN	14	DPWA	
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.026	−26	ROENCHEN	15A	DPWA	Multichannel

$N(2250) \to p\gamma$, helicity-3/2 amplitude $A_{3/2}$

MODULUS ($GeV^{-1/2}$)	PHASE (°)	DOCUMENT ID		TECN	COMMENT
$0.049^{+0.031}_{-0.019}$	171^{+36}_{-43}	ROENCHEN	14	DPWA	
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.119	−42	ROENCHEN	15A	DPWA	Multichannel

N(2250) REFERENCES

ROENCHEN	15A	EPJ A51 70	D. Roenchen et al.	
PDG	14	CP C38 070001	K. Olive et al.	(PDG Collab.)
ROENCHEN	14	EPJ A50 101	D. Roenchen et al.	
Also		EPJ A51 63 (errat.)	D. Roenchen et al.	
SVARC	14	PR C89 045205	A. Svarc et al.	(RBI Zagreb, UNI Tuzla)
ANISOVICH	12A	EPJ A48 15	A.V. Anisovich et al.	(BONN, PNPI)
ARNDT	06	PR C74 045205	R.A. Arndt et al.	(GWU)
HOEHLER	93	πN Newsletter 9 1	G. Hohler	(KARL)
CUTKOSKY	80	Toronto Conf. 19	R.E. Cutkosky et al.	(CMU, LBL) IJP
Also		PR D20 2839	R.E. Cutkosky et al.	(CMU, LBL) IJP
HOEHLER	79	PDAT 12-1	G. Hohler et al.	(KARLT) IJP
Also		Toronto Conf. 3	R. Koch	(KARLT) IJP