$N(2250)\ 9/2^-$

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

Some obsolete results published before 1980 were last included in our 2006 edition, Journal of Physics, G **33** 1 (2006).

N(2250) BREIT-WIGNER MASS

VALUE (MeV)	DOCUMENT ID		TECN	COMMENT
2200 to 2350 (≈ 2275) OUR ESTIMATE				
2280±40	ANISOVICH	12A	DPWA	Multichannel
2302±6	ARNDT	06	DPWA	$\pi N \to \pi N, \eta N$
2250±80	CUTKOSKY	80	IPWA	$\pi N \to \pi N$
2268±15	HOEHLER	79	IPWA	$\pi N \to \pi N$
2200±100	HENDRY	78	MPWA	$\pi N \to \pi N$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
2376±43	ARNDT	04	DPWA	$\pi N \to \pi N, \eta N$
2291	ARNDT	95	DPWA	$\pi N \to N\pi$

N(2250) BREIT-WIGNER WIDTH

VALUE (MeV)	DOCUMENT ID		TECN	COMMENT
230 to 800 (≈ 500) OUR ESTIMATE				
520±50	ANISOVICH	12A	DPWA	Multichannel
628±28	ARNDT	06	DPWA	$\pi N \to \pi N, \eta N$
480±120	CUTKOSKY	80	IPWA	$\pi N \to \pi N$
300±40	HOEHLER	79	IPWA	$\pi N \to \pi N$
350±100	HENDRY	78	MPWA	$\pi N \to \pi N$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
924±178	ARNDT	04	DPWA	$\pi N \to \pi N, \eta N$
772	ARNDT	95	DPWA	$\pi N \to N\pi$

N(2250) POLE POSITION

REAL PART

VALUE (MeV)	DOCUMENT ID		TECN	COMMENT
2150 to 2250 (≈ 2200) OUR ESTIMATE				
2195±45	ANISOVICH	12A	DPWA	Multichannel
2217	ARNDT	06	DPWA	$\pi N \to \pi N, \eta N$
2187	[1] HOEHLER	93	SPED	$\pi N \to \pi N$
2150±50	CUTKOSKY	80	IPWA	$\pi N \to \pi N$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
2238	ARNDT	04	DPWA	$\pi N \to \pi N, \eta N$
2087	ARNDT	95	DPWA	$\pi N \to N\pi$
2243	ARNDT	91	DPWA	$\pi N \to \pi N$ Soln SM90

−2×IMAGINARY PART

VALUE (MeV)	DOCUMENT ID		TECN	COMMENT
350 to 550 (≈ 450) OUR ESTIMATE				
470± 50	ANISOVICH	12A	DPWA	Multichannel
431	ARNDT	06	DPWA	$\pi N \to \pi N$, ηN
388	[1] HOEHLER	93	SPED	$\pi N \to \pi N$
360±100	CUTKOSKY	80	IPWA	$\pi N \to \pi N$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
536	ARNDT	04	DPWA	$\pi N \to \pi N$, ηN
680	ARNDT	95	DPWA	$\pi N \to N\pi$
650	ARNDT	91	DPWA	$\pi N \to \pi N$ Soln SM90

N(2250) ELASTIC POLE RESIDUE

MODULUS |r|

VALUE (MeV)	DOCUMENT ID		TECN	COMMENT
26±5	ANISOVICH	12A	DPWA	Multichannel
21	ARNDT	06	DPWA	$\pi N \to \pi N$, ηN
21	HOEHLER	93	SPED	$\pi N \to \pi N$
20±6	CUTKOSKY	80	IPWA	$\pi N \to \pi N$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
33	ARNDT	04	DPWA	$\pi N \to \pi N$, ηN
24	ARNDT	95	DPWA	$\pi N \to N\pi$
47	ARNDT	91	DPWA	$\pi N \to \pi N$ Soln SM90

PHASE θ

VALUE (°)	DOCUMENT ID		TECN	COMMENT
−38±25	ANISOVICH	12A	DPWA	Multichannel
−20	ARNDT	06	DPWA	$\pi N \to \pi N$, ηN
−50±20	CUTKOSKY	80	IPWA	$\pi N \to \pi N$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
−25	ARNDT	04	DPWA	$\pi N \to \pi N$, ηN
−44	ARNDT	95	DPWA	$\pi N \to N\pi$
−37	ARNDT	91	DPWA	$\pi N \to \pi N$ Soln SM90

N(2250) DECAY MODES

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

	Mode	Fraction (Γ_i/Γ)
Γ_1	$N\pi$	5–15 %
Γ_2	$N\eta$	
Γ_3	ΛK	

$N(2250)$ BRANCHING RATIOS

$\Gamma(N\pi)/\Gamma_{total}$ — Γ_1/Γ

VALUE (%)	DOCUMENT ID		TECN	COMMENT
5 to 15 OUR ESTIMATE				
12 ±4	ANISOVICH	12A	DPWA	Multichannel
8.9±0.1	ARNDT	06	DPWA	$\pi N \to \pi N$, ηN
10 ±2	CUTKOSKY	80	IPWA	$\pi N \to \pi N$
10 ±2	HOEHLER	79	IPWA	$\pi N \to \pi N$
9 ±2	HENDRY	78	MPWA	$\pi N \to \pi N$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
11.0±0.4	ARNDT	04	DPWA	$\pi N \to \pi N$, ηN
10	ARNDT	95	DPWA	$\pi N \to N\pi$

$(\Gamma_i\Gamma_f)^{1/2}/\Gamma_{total}$ in $N\pi \to N(2250) \to \Lambda K$ — $(\Gamma_1\Gamma_3)^{1/2}/\Gamma$

VALUE	DOCUMENT ID		TECN	COMMENT
−0.02	BELL	83	DPWA	$\pi^- p \to \Lambda K^0$
not seen	SAXON	80	DPWA	$\pi^- p \to \Lambda K^0$

$N(2250)$ PHOTON DECAY AMPLITUDES

Papers on γN amplitudes predating 1981 may be found in our 2006 edition, Journal of Physics, G **33** 1 (2006).

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

VALUE ($GeV^{-1/2}$)	DOCUMENT ID		TECN	COMMENT
<0.01	[2] ANISOVICH	12A	DPWA	Multichannel

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

VALUE ($GeV^{-1/2}$)	DOCUMENT ID		TECN	COMMENT
<0.01	[2] ANISOVICH	12A	DPWA	Multichannel

$N(2250)$ FOOTNOTES

[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.

[2] This ANISOVICH 12A value is the complex helicity amplitude at the pole position.

$N(2250)$ REFERENCES

ANISOVICH	12A	EPJ A48 15	A.V. Anisovich et al.	(BONN, PNPI)
ARNDT	06	PR C74 045205	R.A. Arndt et al.	(GWU)
PDG	06	JPG 33 1	W.-M. Yao et al.	(PDG Collab.)
ARNDT	04	PR C69 035213	R.A. Arndt et al.	(GWU, TRIU)
ARNDT	95	PR C52 2120	R.A. Arndt et al.	(VPI, BRCO)
HOEHLER	93	πN Newsletter 9 1	G. Hohler	(KARL)

ARNDT	91	PR D43 2131	R.A. Arndt *et al.*	(VPI, TELE) IJP
BELL	83	NP B222 389	K.W. Bell *et al.*	(RL) IJP
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
SAXON	80	NP B162 522	D.H. Saxon *et al.*	(RHEL, BRIS) IJP
HOEHLER	79	PDAT 12-1	G. Hohler *et al.*	(KARLT) IJP
Also		Toronto Conf. 3	R. Koch	(KARLT) IJP
HENDRY	78	PRL 41 222	A.W. Hendry	(IND, LBL) IJP
Also		ANP 136 1	A.W. Hendry	(IND)