

$N(2250) 9/2^-$ $I(J^P) = \frac{1}{2}(\frac{9}{2}^-)$ Status: ****

Some obsolete results published before 1980 were last included in our 2006 edition, *Journal of Physics* (generic for all A,B,E,G) **G33** 1 (2006).

 $N(2250)$ BREIT-WIGNER MASS

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

 $N(2250)$ BREIT-WIGNER WIDTH

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

 $N(2250)$ POLE POSITION**REAL PART**

<u>VALUE (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
2150 to 2250 (≈ 2200) OUR ESTIMATE			
2195 \pm 45	ANISOVICH	12A	DPWA Multichannel
2217	ARNDT	06	DPWA $\pi N \rightarrow \pi N, \eta N$
2187	¹ HOEHLER	93	SPED $\pi N \rightarrow \pi N$
2150 \pm 50	CUTKOSKY	80	IPWA $\pi N \rightarrow \pi N$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●			
2238	ARNDT	04	DPWA $\pi N \rightarrow \pi N, \eta N$
2087	ARNDT	95	DPWA $\pi N \rightarrow N\pi$
2243	ARNDT	91	DPWA $\pi N \rightarrow \pi N$ 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 $\pi N \rightarrow \pi N, \eta N$
388	¹ HOEHLER	93	SPED $\pi N \rightarrow \pi N$
360 ± 100	CUTKOSKY	80	IPWA $\pi N \rightarrow \pi N$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●			
536	ARNDT	04	DPWA $\pi N \rightarrow \pi N, \eta N$
680	ARNDT	95	DPWA $\pi N \rightarrow N\pi$
650	ARNDT	91	DPWA $\pi N \rightarrow \pi N$ 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 $\pi N \rightarrow \pi N, \eta N$
21	HOEHLER	93	SPED $\pi N \rightarrow \pi N$
20 ± 6	CUTKOSKY	80	IPWA $\pi N \rightarrow \pi N$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●			
33	ARNDT	04	DPWA $\pi N \rightarrow \pi N, \eta N$
24	ARNDT	95	DPWA $\pi N \rightarrow N\pi$
47	ARNDT	91	DPWA $\pi N \rightarrow \pi N$ Soln SM90

PHASE θ

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

N(2250) DECAY MODES

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

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

$N(2250)$ BRANCHING RATIOS

$\Gamma(N\pi)/\Gamma_{\text{total}}$					Γ_1/Γ
<u>VALUE (%)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>		
5 to 15 OUR ESTIMATE					
12 \pm 4	ANISOVICH	12A	DPWA	Multichannel	
8.9 \pm 0.1	ARNDT	06	DPWA	$\pi N \rightarrow \pi N, \eta N$	
10 \pm 2	CUTKOSKY	80	IPWA	$\pi N \rightarrow \pi N$	
10 \pm 2	HOEHLER	79	IPWA	$\pi N \rightarrow \pi N$	
9 \pm 2	HENDRY	78	MPWA	$\pi N \rightarrow \pi N$	
• • • We do not use the following data for averages, fits, limits, etc. • • •					
11.0 \pm 0.4	ARNDT	04	DPWA	$\pi N \rightarrow \pi N, \eta N$	
10	ARNDT	95	DPWA	$\pi N \rightarrow N\pi$	

$(\Gamma_i\Gamma_f)^{1/2}/\Gamma_{\text{total}}$ in $N\pi \rightarrow N(2250) \rightarrow \Lambda K$					$(\Gamma_1\Gamma_3)^{1/2}/\Gamma$
<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>		
-0.02	BELL	83	DPWA	$\pi^- p \rightarrow \Lambda K^0$	
not seen	SAXON	80	DPWA	$\pi^- p \rightarrow \Lambda K^0$	

$N(2250)$ PHOTON DECAY AMPLITUDES

Papers on γN amplitudes predating 1981 may be found in our 2006 edition, *Journal of Physics* (generic for all A,B,E,G) **G33** 1 (2006).

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

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

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

<u>VALUE (GeV^{-1/2})</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>	
<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 <i>et al.</i>	(BONN, PNPI)
ARNDT	06	PR C74 045205	R.A. Arndt <i>et al.</i>	(GWU)
PDG	06	JP G33 1	W.-M. Yao <i>et al.</i>	(PDG Collab.)
ARNDT	04	PR C69 035213	R.A. Arndt <i>et al.</i>	(GWU, TRIU)
ARNDT	95	PR C52 2120	R.A. Arndt <i>et al.</i>	(VPI, BRCO)
HOEHLER	93	πN Newsletter 9 1	G. Hohler	(KARL)

ARNDT	91	PR D43 2131	R.A. Arndt <i>et al.</i>	(VPI, TELE) IJP
BELL	83	NP B222 389	K.W. Bell <i>et al.</i>	(RL) IJP
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) IJP
SAXON	80	NP B162 522	D.H. Saxon <i>et al.</i>	(RHEL, BRIS) IJP
HOEHLER	79	PDAT 12-1	G. Hohler <i>et al.</i>	(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)
