

$N(1900) \ 3/2^+$

$I(J^P) = \frac{1}{2}(3/2^+)$ Status: ***

The latest GWU analysis (ARNDT 06) finds no evidence for this resonance.

$N(1900)$ BREIT-WIGNER MASS

<u>VALUE (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
≈ 1900 OUR ESTIMATE			
1905 ± 30	ANISOVICH	12A	DPWA Multichannel
1915 ± 60	NIKONOV	08	DPWA Multichannel
• • • We do not use the following data for averages, fits, limits, etc. • • •			
1900 ± 8	SHRESTHA	12A	DPWA Multichannel
1951 ± 53	PENNER	02C	DPWA Multichannel
1879 ± 17	MANLEY	92	IPWA $\pi N \rightarrow \pi N$ & $N\pi\pi$

$N(1900)$ BREIT-WIGNER WIDTH

<u>VALUE (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
~ 250 OUR ESTIMATE			
250^{+120}_{-50}	ANISOVICH	12A	DPWA Multichannel
180 ± 40	NIKONOV	08	DPWA Multichannel
• • • We do not use the following data for averages, fits, limits, etc. • • •			
101 ± 15	SHRESTHA	12A	DPWA Multichannel
622 ± 42	PENNER	02C	DPWA Multichannel
498 ± 78	MANLEY	92	IPWA $\pi N \rightarrow \pi N$ & $N\pi\pi$

$N(1900)$ POLE POSITION

REAL PART

<u>VALUE (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
1900 ± 30			
	ANISOVICH	12A	DPWA Multichannel
• • • We do not use the following data for averages, fits, limits, etc. • • •			
1895	SHRESTHA	12A	DPWA Multichannel

$-2 \times$ IMAGINARY PART

<u>VALUE (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
200^{+100}_{-60}			
	ANISOVICH	12A	DPWA Multichannel
• • • We do not use the following data for averages, fits, limits, etc. • • •			
100	SHRESTHA	12A	DPWA Multichannel

$N(1900)$ ELASTIC POLE RESIDUE

MODULUS $|r|$

<u>VALUE (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
3 ± 2	ANISOVICH	12A	DPWA Multichannel

PHASE θ

<u>VALUE ($^{\circ}$)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
10 ± 35	ANISOVICH	12A	DPWA Multichannel

$N(1900)$ INELASTIC POLE RESIDUE

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

Normalized residue in $N\pi \rightarrow N(1900) \rightarrow N\eta$

<u>MODULUS (%)</u>	<u>PHASE ($^{\circ}$)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
5 ± 2	70 ± 60	ANISOVICH	12A	DPWA Multichannel

Normalized residue in $N\pi \rightarrow N(1900) \rightarrow \Lambda K$

<u>MODULUS (%)</u>	<u>PHASE ($^{\circ}$)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
7 ± 3	135 ± 25	ANISOVICH	12A	DPWA Multichannel

Normalized residue in $N\pi \rightarrow N(1900) \rightarrow \Sigma K$

<u>MODULUS (%)</u>	<u>PHASE ($^{\circ}$)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
4 ± 2	110 ± 30	ANISOVICH	12A	DPWA Multichannel

$N(1900)$ DECAY MODES

Mode	Fraction (Γ_i/Γ)
Γ_1 $N\pi$	~ 10 %
Γ_2 $N\pi\pi$	
Γ_3 $N\rho, S=1/2, P$ -wave	
Γ_4 $N\eta$	~ 12 %
Γ_5 $N\omega$	(39 ± 9) %
Γ_6 ΛK	0-10 %
Γ_7 ΣK	(5.0 ± 2.0) %
Γ_8 $p\gamma$	
Γ_9 $p\gamma, \text{ helicity}=1/2$	
Γ_{10} $p\gamma, \text{ helicity}=3/2$	
Γ_{11} $n\gamma$	
Γ_{12} $n\gamma, \text{ helicity}=1/2$	
Γ_{13} $n\gamma, \text{ helicity}=3/2$	

$N(1900)$ BRANCHING RATIOS

<u>$\Gamma(N\pi)/\Gamma_{total}$</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>	<u>Γ_1/Γ</u>
~ 10 OUR ESTIMATE				
3 ± 2	ANISOVICH	12A	DPWA Multichannel	
• • • We do not use the following data for averages, fits, limits, etc. • • •				
7 ± 4	SHRESTHA	12A	DPWA Multichannel	
2 to 9	NIKONOV	08	DPWA Multichannel	
16 ± 2	PENNER	02C	DPWA Multichannel	
26 ± 6	MANLEY	92	IPWA $\pi N \rightarrow \pi N$ & $N\pi\pi$	

$\Gamma(N\eta)/\Gamma_{\text{total}}$ Γ_4/Γ

<u>VALUE (%)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
~ 12 OUR ESTIMATE			
10±4	ANISOVICH	12A	DPWA Multichannel
14±5	PENNER	02C	DPWA Multichannel
• • • We do not use the following data for averages, fits, limits, etc. • • •			
< 1	SHRESTHA	12A	DPWA Multichannel

$\Gamma(N\omega)/\Gamma_{\text{total}}$ Γ_5/Γ

<u>VALUE (%)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
39±9	PENNER	02C	DPWA Multichannel

$(\Gamma_i\Gamma_f)^{1/2}/\Gamma_{\text{total}}$ in $N\pi \rightarrow N(1900) \rightarrow N\rho, S=1/2, P\text{-wave}$ $(\Gamma_1\Gamma_3)^{1/2}/\Gamma$

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
• • • We do not use the following data for averages, fits, limits, etc. • • •			
0.21±0.08	SHRESTHA	12A	DPWA Multichannel
-0.34±0.03	MANLEY	92	IPWA $\pi N \rightarrow \pi N$ & $N\pi\pi$

$\Gamma(\Lambda K)/\Gamma_{\text{total}}$ Γ_6/Γ

<u>VALUE (%)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
0 to 10 OUR ESTIMATE			
16 ±5	ANISOVICH	12A	DPWA Multichannel
2.4±0.3	SHKLYAR	05	DPWA Multichannel
• • • We do not use the following data for averages, fits, limits, etc. • • •			
14 ±5	SHRESTHA	12A	DPWA Multichannel
5 to 15	NIKONOV	08	DPWA Multichannel
0.1±0.1	PENNER	02C	DPWA Multichannel

$\Gamma(\Sigma K)/\Gamma_{\text{total}}$ Γ_7/Γ

<u>VALUE (%)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
5±2	ANISOVICH	12A	DPWA Multichannel
• • • We do not use the following data for averages, fits, limits, etc. • • •			
1±1	PENNER	02C	DPWA Multichannel

$N(1900)$ PHOTON DECAY AMPLITUDES

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

$N(1900) \rightarrow p\gamma$, helicity-1/2 amplitude $A_{1/2}$

<u>VALUE (GeV^{-1/2})</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
0.026±0.015	ANISOVICH	12A	DPWA Multichannel
• • • We do not use the following data for averages, fits, limits, etc. • • •			
0.041±0.008	SHRESTHA	12A	DPWA Multichannel
-0.017	PENNER	02D	DPWA Multichannel

$N(1900) \rightarrow p\gamma$, helicity-3/2 amplitude $A_{3/2}$

<u>VALUE (GeV^{-1/2})</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
-0.065 ± 0.030	ANISOVICH	12A	DPWA Multichannel
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●			
-0.004 ± 0.006	SHRESTHA	12A	DPWA Multichannel
0.031	PENNER	02D	DPWA Multichannel

$N(1900) \rightarrow n\gamma$, helicity-1/2 amplitude $A_{1/2}$

<u>VALUE (GeV^{-1/2})</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●			
-0.010 ± 0.004	SHRESTHA	12A	DPWA Multichannel
-0.016	PENNER	02D	DPWA Multichannel

$N(1900) \rightarrow n\gamma$, helicity-3/2 amplitude $A_{3/2}$

<u>VALUE (GeV^{-1/2})</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●			
-0.011 ± 0.007	SHRESTHA	12A	DPWA Multichannel
-0.002	PENNER	02D	DPWA Multichannel

$N(1900)$ REFERENCES

ANISOVICH	12A	EPJ A48 15	A.V. Anisovich <i>et al.</i>	(BONN, PNPI)
SHRESTHA	12A	PR C86 055203	M. Shrestha, D.M. Manley	(KSU)
NIKONOV	08	PL B662 245	V.A. Nikonov <i>et al.</i>	(Bonn, Gatchina)
ARNDT	06	PR C74 045205	R.A. Arndt <i>et al.</i>	(GWU)
PDG	06	JPG 33 1	W.-M. Yao <i>et al.</i>	(PDG Collab.)
SHKLYAR	05	PR C72 015210	V. Shklyar, H. Lenske, U. Mosel	(GIES)
PENNER	02C	PR C66 055211	G. Penner, U. Mosel	(GIES)
PENNER	02D	PR C66 055212	G. Penner, U. Mosel	(GIES)
MANLEY	92	PR D45 4002	D.M. Manley, E.M. Saleski	(KSA)
Also		PR D30 904	D.M. Manley <i>et al.</i>	(VPI)