$N(1880)\ 1/2^+$

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

N(1880) POLE POSITION

REAL PART

VALUE (MeV)	*DOCUMENT ID*		*TECN*	*COMMENT*
1820 to 1900 (≈ 1860) OUR ESTIMATE				
1860±40	ANISOVICH	17A	DPWA	Multichannel
• • • We do not use the following data for averages, fits, limits, etc. • • •				
1880	HUNT	19	DPWA	Multichannel
1875±11	[1] ANISOVICH	17A	L+P	$\gamma p,\ \pi^- p \to K\Lambda$
1870±40	SOKHOYAN	15A	DPWA	Multichannel
1870±40	GUTZ	14	DPWA	Multichannel
1860±35	ANISOVICH	12A	DPWA	Multichannel

[1] Statistical error only.

−2×IMAGINARY PART

VALUE (MeV)	*DOCUMENT ID*		*TECN*	*COMMENT*
180 to 280 (≈ 230) OUR ESTIMATE				
230±50	ANISOVICH	17A	DPWA	Multichannel
• • • We do not use the following data for averages, fits, limits, etc. • • •				
429	HUNT	19	DPWA	Multichannel
33± 9	[2] ANISOVICH	17A	L+P	$\gamma p,\ \pi^- p \to K\Lambda$
220±50	SOKHOYAN	15A	DPWA	Multichannel
220±50	GUTZ	14	DPWA	Multichannel
250±70	ANISOVICH	12A	DPWA	Multichannel

[2] Statistical error only.

N(1880) ELASTIC POLE RESIDUE

MODULUS $|r|$

VALUE (MeV)	*DOCUMENT ID*		*TECN*	*COMMENT*
6±4	SOKHOYAN	15A	DPWA	Multichannel
• • • We do not use the following data for averages, fits, limits, etc. • • •				
6±4	GUTZ	14	DPWA	Multichannel
6±4	ANISOVICH	12A	DPWA	Multichannel

PHASE θ

VALUE (°)	*DOCUMENT ID*		*TECN*	*COMMENT*
70±60	SOKHOYAN	15A	DPWA	Multichannel
• • • We do not use the following data for averages, fits, limits, etc. • • •				
70±60	GUTZ	14	DPWA	Multichannel
80±65	ANISOVICH	12A	DPWA	Multichannel

N(1880) INELASTIC POLE RESIDUE

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

Normalized residue in $N\pi \to N(1880) \to N\eta$

MODULUS	*PHASE (°)*	*DOCUMENT ID*		*TECN*	*COMMENT*
0.11±0.07	−75 ± 55	ANISOVICH	12A	DPWA	Multichannel

Normalized residue in $N\pi \to N(1880) \to \Lambda K$

MODULUS	*PHASE (°)*	*DOCUMENT ID*		*TECN*	*COMMENT*
0.05±0.02	27 ± 30	ANISOVICH	17A	DPWA	$\gamma p, \pi^- p \to K\Lambda$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.3 ±0.1	82 ± 9	[3] ANISOVICH	17A	L+P	$\gamma p, \pi^- p \to K\Lambda$
0.03±0.02	40 ± 40	ANISOVICH	12A	DPWA	Multichannel

[3] Statistical error only.

Normalized residue in $N\pi \to N(1880) \to \Sigma K$

MODULUS	*PHASE (°)*	*DOCUMENT ID*		*TECN*	*COMMENT*
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.11±0.06	95 ± 40	ANISOVICH	12A	DPWA	Multichannel

Normalized residue in $N\pi \to N(1880) \to \Delta\pi$, *P*-wave

MODULUS	*PHASE (°)*	*DOCUMENT ID*		*TECN*	*COMMENT*
0.14±0.08	−150 ± 55	SOKHOYAN	15A	DPWA	Multichannel
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.20±0.08	−150 ± 50	ANISOVICH	12A	DPWA	Multichannel

Normalized residue in $N\pi \to N(1880) \to N(1535)\pi$

MODULUS	*PHASE (°)*	*DOCUMENT ID*		*TECN*	*COMMENT*
0.09±0.05	130 ± 60	GUTZ	14	DPWA	Multichannel

Normalized residue in $N\pi \to N(1880) \to N a_0(980)$

MODULUS	*PHASE (°)*	*DOCUMENT ID*		*TECN*	*COMMENT*
0.04±0.03	40 ± 65	GUTZ	14	DPWA	Multichannel

Normalized residue in $N\pi \to N(1880) \to N\sigma$

MODULUS	*PHASE (°)*	*DOCUMENT ID*		*TECN*	*COMMENT*
0.10±0.05	−140 ± 55	SOKHOYAN	15A	DPWA	Multichannel

N(1880) BREIT-WIGNER MASS

VALUE (MeV)	*DOCUMENT ID*		*TECN*	*COMMENT*
1830 to 1930 (≈ 1880) OUR ESTIMATE				
1967±20	[4] HUNT	19	DPWA	Multichannel
1875±40	SOKHOYAN	15A	DPWA	Multichannel
• • • We do not use the following data for averages, fits, limits, etc. • • •				
1875±40	GUTZ	14	DPWA	Multichannel
1870±35	ANISOVICH	12A	DPWA	Multichannel
1900±36	[4] SHRESTHA	12A	DPWA	Multichannel

[4] Statistical error only.

N(1880) BREIT-WIGNER WIDTH

VALUE (MeV)	*DOCUMENT ID*		*TECN*	*COMMENT*
200 to 400 (≈ 300) OUR ESTIMATE				
500± 77	[5] HUNT	19	DPWA	Multichannel
230± 50	SOKHOYAN	15A	DPWA	Multichannel
• • • We do not use the following data for averages, fits, limits, etc. • • •				
230± 50	GUTZ	14	DPWA	Multichannel
235± 65	ANISOVICH	12A	DPWA	Multichannel
485±142	[5] SHRESTHA	12A	DPWA	Multichannel

[5] Statistical error only.

N(1880) DECAY MODES

	Mode	Fraction (Γ_i/Γ)
Γ_1	$N\pi$	3–31 %
Γ_2	$N\eta$	1–55 %
Γ_3	$N\omega$	12–28 %
Γ_4	ΛK	1–3 %
Γ_5	ΣK	10–24 %
Γ_6	$N\pi\pi$	>32 %
Γ_7	$\Delta(1232)\pi$	5–42 %
Γ_8	$N\rho$, S=1/2, P-wave	19–45 %
Γ_9	$N\sigma$	8–40 %
Γ_{10}	$N(1535)\pi$	4–12 %
Γ_{11}	$Na_0(980)$	1–5 %
Γ_{12}	$\Lambda K^*(892)$	0.5–1.1 %
Γ_{13}	$p\gamma$, helicity=1/2	seen
Γ_{14}	$n\gamma$, helicity=1/2	0.002–0.63 %

N(1880) BRANCHING RATIOS

$\Gamma(N\pi)/\Gamma_{\text{total}}$ **Γ_1/Γ**

VALUE (%)	*DOCUMENT ID*		*TECN*	*COMMENT*
3–31 % OUR ESTIMATE				
25±6	[6] HUNT	19	DPWA	Multichannel
6±3	SOKHOYAN	15A	DPWA	Multichannel
• • • We do not use the following data for averages, fits, limits, etc. • • •				
6±3	GUTZ	14	DPWA	Multichannel
5±3	ANISOVICH	12A	DPWA	Multichannel
15±5	[6] SHRESTHA	12A	DPWA	Multichannel

[6] Statistical error only.

$\Gamma(N\eta)/\Gamma_{\text{total}}$ Γ_2/Γ

VALUE (%)	DOCUMENT ID		TECN	COMMENT
1–55 % OUR ESTIMATE				
18 ± 8	MUELLER	20	DPWA	Multichannel
2 ± 1	[7] HUNT	19	DPWA	Multichannel
25^{+30}_{-20}	ANISOVICH	12A	DPWA	Multichannel
• • • We do not use the following data for averages, fits, limits, etc. • • •				
16 ± 7	[7] SHRESTHA	12A	DPWA	Multichannel

[7] Statistical error only.

$\Gamma(N\omega)/\Gamma_{\text{total}}$ Γ_3/Γ

VALUE (%)	DOCUMENT ID		TECN	COMMENT
12–28 % OUR ESTIMATE				
20 ± 8	DENISENKO	16	DPWA	Multichannel

$\Gamma(\Lambda K)/\Gamma_{\text{total}}$ Γ_4/Γ

VALUE (%)	DOCUMENT ID		TECN	COMMENT
1–3 % OUR ESTIMATE				
2 ± 1	[8] HUNT	19	DPWA	Multichannel
2 ± 1	ANISOVICH	12A	DPWA	Multichannel
• • • We do not use the following data for averages, fits, limits, etc. • • •				
32 ± 10	[8] SHRESTHA	12A	DPWA	Multichannel

[8] Statistical error only.

$\Gamma(\Sigma K)/\Gamma_{\text{total}}$ Γ_5/Γ

VALUE (%)	DOCUMENT ID		TECN	COMMENT
10–24 % OUR ESTIMATE				
17 ± 7	ANISOVICH	12A	DPWA	Multichannel

$\Gamma(\Delta(1232)\pi)/\Gamma_{\text{total}}$ Γ_7/Γ

VALUE (%)	DOCUMENT ID		TECN	COMMENT
5–42 % OUR ESTIMATE				
11 ± 6	[9] HUNT	19	DPWA	Multichannel
30 ± 12	SOKHOYAN	15A	DPWA	Multichannel
• • • We do not use the following data for averages, fits, limits, etc. • • •				
29 ± 12	ANISOVICH	12A	DPWA	Multichannel
< 2	[9] SHRESTHA	12A	DPWA	Multichannel

[9] Statistical error only.

$\Gamma(N\rho, S{=}1/2, P\text{-wave})/\Gamma_{\text{total}}$ Γ_8/Γ

VALUE (%)	DOCUMENT ID		TECN	COMMENT
19–45 % OUR ESTIMATE				
32 ± 13	[10] HUNT	19	DPWA	Multichannel

[10] Statistical error only.

$\Gamma(N\sigma)/\Gamma_{total}$ Γ_9/Γ

VALUE (%)	DOCUMENT ID		TECN	COMMENT
8–40 % OUR ESTIMATE				
< 9	[11] HUNT	19	DPWA	Multichannel
25 ± 15	SOKHOYAN	15A	DPWA	Multichannel
• • • We do not use the following data for averages, fits, limits, etc. • • •				
8 ± 5	[11] SHRESTHA	12A	DPWA	Multichannel

[11] Statistical error only.

$\Gamma(N(1535)\pi)/\Gamma_{total}$ Γ_{10}/Γ

VALUE (%)	DOCUMENT ID		TECN	COMMENT
4–12 % OUR ESTIMATE				
8 ± 4	GUTZ	14	DPWA	Multichannel

$\Gamma(N a_0(980))/\Gamma_{total}$ Γ_{11}/Γ

VALUE (%)	DOCUMENT ID		TECN	COMMENT
1–5 % OUR ESTIMATE				
3 ± 2	GUTZ	14	DPWA	Multichannel

$\Gamma(\Lambda K^*(892))/\Gamma_{total}$ Γ_{12}/Γ

VALUE (%)	DOCUMENT ID		TECN	COMMENT
0.5–1.1 % OUR ESTIMATE				
0.8 ± 0.3	ANISOVICH	17B	DPWA	Multichannel

$N(1880)$ PHOTON DECAY AMPLITUDES AT THE POLE

$N(1880) \to n\gamma$, helicity-1/2 amplitude $A_{1/2}$

MODULUS ($GeV^{-1/2}$)	PHASE ($^\circ$)	DOCUMENT ID		TECN	COMMENT
0.072 ± 0.024	-30 ± 30	ANISOVICH	17E	DPWA	Multichannel

$N(1880)$ BREIT-WIGNER PHOTON DECAY AMPLITUDES

$N(1880) \to p\gamma$, helicity-1/2 amplitude $A_{1/2}$

VALUE ($GeV^{-1/2}$)	DOCUMENT ID		TECN	COMMENT
0.119 ± 0.015	[12] HUNT	19	DPWA	Multichannel
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.021 ± 0.006	[12] SHRESTHA	12A	DPWA	Multichannel

[12] Statistical error only.

$N(1880) \to n\gamma$, helicity-1/2 amplitude $A_{1/2}$

VALUE ($GeV^{-1/2}$)	DOCUMENT ID		TECN	COMMENT
0.016 ± 0.010	[13] HUNT	19	DPWA	Multichannel
0.070 ± 0.022	ANISOVICH	17E	DPWA	Multichannel
• • • We do not use the following data for averages, fits, limits, etc. • • •				
-0.060 ± 0.050	ANISOVICH	13B	DPWA	Multichannel
0.014 ± 0.007	[13] SHRESTHA	12A	DPWA	Multichannel

[13] Statistical error only.

N(1880) REFERENCES

MUELLER	20	PL B803 135323	J. Mueller *et al.*	(CBELSA/TAPS Collab.)
HUNT	19	PR C99 055205	B.C. Hunt, D.M. Manley	
ANISOVICH	17A	PRL 119 062004	A.V. Anisovich *et al.*	
ANISOVICH	17B	PL B771 142	A.V. Anisovich *et al.*	
ANISOVICH	17E	PR C96 055202	A.V. Anisovich *et al.*	(BONN, PNPI, JLAB+)
DENISENKO	16	PL B755 97	I. Denisenko *et al.*	
SOKHOYAN	15A	EPJ A51 95	V. Sokhoyan *et al.*	(CBELSA/TAPS Collab.)
GUTZ	14	EPJ A50 74	E. Gutz *et al.*	(CBELSA/TAPS Collab.)
ANISOVICH	13B	EPJ A49 67	A.V. Anisovich *et al.*	
ANISOVICH	12A	EPJ A48 15	A.V. Anisovich *et al.*	(BONN, PNPI)
SHRESTHA	12A	PR C86 055203	M. Shrestha, D.M. Manley	(KSU)