$$\boxed{N(1895)\,1/2^-}$$ $I(J^P) = \frac{1}{2}(\frac{1}{2}^-)$ Status: ∗∗∗∗

Before our 2012 *Review*, this state appeared in our Listings as the $N(2090)$. Any structure in the S_{11} wave above 1800 MeV is listed here. A few early results that are now obsolete have been omitted.

$N(1895)$ POLE POSITION

REAL PART

VALUE (MeV)	DOCUMENT ID		TECN	COMMENT
1890 to 1930 (≈ 1910) OUR ESTIMATE				
1895 ± 15	ANISOVICH	17A	DPWA	Multichannel
1906 ± 17	[1] ANISOVICH	17A	L+P	$\gamma p,\ \pi^- p \to\ K\Lambda$
$1917\pm19\pm1$	[2] SVARC	14	L+P	$\pi N \to\ \pi N$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
1907 ± 10	ANISOVICH	17C	DPWA	Multichannel
1907 ± 10	SOKHOYAN	15A	DPWA	Multichannel
1900 ± 15	ANISOVICH	12A	DPWA	Multichannel
1858	SHRESTHA	12A	DPWA	Multichannel
1797 ± 26	BATINIC	10	DPWA	$\pi N \to\ N\pi,\ N\eta$
1795	VRANA	00	DPWA	Multichannel
2150 ± 70	CUTKOSKY	80	IPWA	$\pi N \to\ \pi N$

[1] Statistical error only.
[2] Fit to the amplitudes of HOEHLER 79.

$-2\times$IMAGINARY PART

VALUE (MeV)	DOCUMENT ID		TECN	COMMENT
80 to 140 (≈ 110) OUR ESTIMATE				
132 ± 30	ANISOVICH	17A	DPWA	Multichannel
100 ± 10	[1] ANISOVICH	17A	L+P	$\gamma p,\ \pi^- p \to\ K\Lambda$
$101\pm36\pm1$	[1,2] SVARC	14	L+P	$\pi N \to\ \pi N$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
100^{+40}_{-10}	ANISOVICH	17C	DPWA	Multichannel
100^{+40}_{-15}	SOKHOYAN	15A	DPWA	Multichannel
90^{+30}_{-15}	ANISOVICH	12A	DPWA	Multichannel
479	SHRESTHA	12A	DPWA	Multichannel
420 ± 45	BATINIC	10	DPWA	$\pi N \to\ N\pi,\ N\eta$
220	VRANA	00	DPWA	Multichannel
350 ± 100	CUTKOSKY	80	IPWA	$\pi N \to\ \pi N$

[1] Statistical error only.
[2] Fit to the amplitudes of HOEHLER 79.

N(1895) ELASTIC POLE RESIDUE

MODULUS |*r*|

VALUE (MeV)		DOCUMENT ID		TECN	COMMENT
1 to 5 (≈ 3) OUR ESTIMATE					
3 ± 2		SOKHOYAN	15A	DPWA	Multichannel
3.1± 1.4	[1]	SVARC	14	L+P	$\pi N \to \pi N$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
1 ± 1		ANISOVICH	12A	DPWA	Multichannel
60		BATINIC	10	DPWA	$\pi N \to N\pi, N\eta$
40 ±20		CUTKOSKY	80	IPWA	$\pi N \to \pi N$

[1] Fit to the amplitudes of HOEHLER 79.

PHASE θ

VALUE (°)		DOCUMENT ID		TECN	COMMENT
125±45		SOKHOYAN	15A	DPWA	Multichannel
−107±23±2	[1]	SVARC	14	L+P	$\pi N \to \pi N$
0±90		CUTKOSKY	80	IPWA	$\pi N \to \pi N$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
−164		BATINIC	10	DPWA	$\pi N \to N\pi, N\eta$

[1] Fit to the amplitudes of HOEHLER 79.

N(1895) INELASTIC POLE RESIDUE

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

Normalized residue in $N\pi \to N(1895) \to \Lambda K$

MODULUS	PHASE (°)	DOCUMENT ID		TECN	COMMENT
0.09±0.03	8 ± 30	ANISOVICH	17A	DPWA	Multichannel
0.06±0.02	87 ± 27	[1] ANISOVICH	17A	L+P	$\gamma p, \pi^- p \to K\Lambda$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.05±0.02	−90 ± 30	ANISOVICH	12A	DPWA	Multichannel

[1] Statistical error only.

Normalized residue in $N\pi \to N(1895) \to \Sigma K$

MODULUS	PHASE (°)	DOCUMENT ID		TECN	COMMENT
0.06±0.02	40 ± 30	ANISOVICH	12A	DPWA	Multichannel

Normalized residue in $N\pi \to N(1895) \to \Delta(1232)\pi$

MODULUS	PHASE (°)	DOCUMENT ID		TECN	COMMENT
0.05±0.025	−100 ± 45	SOKHOYAN	15A	DPWA	Multichannel

Normalized residue in $N\pi \to N(1895) \to N(1440)\pi$

MODULUS	PHASE (°)	DOCUMENT ID		TECN	COMMENT
0.05±0.025	−100 ± 45	SOKHOYAN	15A	DPWA	Multichannel

N(1895) BREIT-WIGNER MASS

VALUE (MeV)	DOCUMENT ID		TECN	COMMENT
1870 to 1920 (≈ 1895) OUR ESTIMATE				
$1890^{+\ 9}_{-23}$	KASHEVAROV	17	DPWA	$\gamma p \rightarrow \eta p, \eta' p$
1905 ± 12	SOKHOYAN	15A	DPWA	Multichannel
1910 ± 15	[1] SHRESTHA	12A	DPWA	Multichannel
1880 ± 20	HOEHLER	79	IPWA	$\pi N \rightarrow \pi N$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
1895 ± 15	ANISOVICH	12A	DPWA	Multichannel
1812 ± 25	BATINIC	10	DPWA	$\pi N \rightarrow N\pi, N\eta$
1822 ± 43	VRANA	00	DPWA	Multichannel
2180 ± 80	CUTKOSKY	80	IPWA	$\pi N \rightarrow \pi N$

[1] Statistical error only.

N(1895) BREIT-WIGNER WIDTH

VALUE (MeV)	DOCUMENT ID		TECN	COMMENT
80 to 200 (≈ 120) OUR ESTIMATE				
150 ± 57	KASHEVAROV	17	DPWA	$\gamma p \rightarrow \eta p, \eta' p$
$100^{+\ 30}_{-\ 10}$	SOKHOYAN	15A	DPWA	Multichannel
502 ± 47	[1] SHRESTHA	12A	DPWA	Multichannel
95 ± 30	HOEHLER	79	IPWA	$\pi N \rightarrow \pi N$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$90^{+\ 30}_{-\ 15}$	ANISOVICH	12A	DPWA	Multichannel
405 ± 40	BATINIC	10	DPWA	$\pi N \rightarrow N\pi, N\eta$
248 ± 185	VRANA	00	DPWA	Multichannel
350 ± 100	CUTKOSKY	80	IPWA	$\pi N \rightarrow \pi N$

[1] Statistical error only.

N(1895) DECAY MODES

	Mode	Fraction (Γ_i/Γ)
Γ_1	$N\pi$	2–18 %
Γ_2	$N\eta$	15–40 %
Γ_3	$N\eta'$	10–40 %
Γ_4	$N\omega$	16–40 %
Γ_5	ΛK	13–23 %
Γ_6	ΣK	6–20 %
Γ_7	$N\pi\pi$	
Γ_8	$\Delta(1232)\pi$	
Γ_9	$\Delta(1232)\pi$, *D*-wave	3–11 %

Γ_{10}	$N\rho$			
Γ_{11}	$N\rho$, $S=1/2$, S-wave		seen	
Γ_{12}	$N\rho$, $S=3/2$, D-wave		3–12 %	
Γ_{13}	$\Lambda K^*(892)$		4–9 %	
Γ_{14}	$N\sigma$		seen	
Γ_{15}	$N(1440)\pi$		1–4 %	
Γ_{16}	$p\gamma$, helicity=1/2		0.01–0.06 %	
Γ_{17}	$n\gamma$, helicity=1/2		0.003–0.05 %	

$N(1895)$ BRANCHING RATIOS

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

VALUE (%)	DOCUMENT ID		TECN	COMMENT
2 to 18 ($\approx$ 10) OUR ESTIMATE				
2.5±1.5	SOKHOYAN	15A	DPWA	Multichannel
17 ±2	[1] SHRESTHA	12A	DPWA	Multichannel
9 ±5	HOEHLER	79	IPWA	$\pi N \to \pi N$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
2 ±1	ANISOVICH	12A	DPWA	Multichannel
32 ±6	BATINIC	10	DPWA	$\pi N \to N\pi, N\eta$
17 ±3	VRANA	00	DPWA	Multichannel
18 ±8	CUTKOSKY	80	IPWA	$\pi N \to \pi N$

[1] Statistical error only.

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

VALUE (%)	DOCUMENT ID		TECN	COMMENT
15 to 40 ($\approx$ 25) OUR ESTIMATE				
10± 5	ANISOVICH	17C	DPWA	Multichannel
20± 6	[1] KASHEVAROV	17	DPWA	$\gamma p \to \eta p, \eta' p$
40± 4	[2] SHRESTHA	12A	DPWA	Multichannel
• • • We do not use the following data for averages, fits, limits, etc. • • •				
21± 6	ANISOVICH	12A	DPWA	Multichannel
22±10	BATINIC	10	DPWA	$\pi N \to N\pi, N\eta$
41± 4	VRANA	00	DPWA	Multichannel

[1] Assuming $A_{1/2} = -0.030$ GeV$^{-1/2}$.

[2] Statistical error only.

$\Gamma(N\eta')/\Gamma_{total}$ $\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad$ Γ_3/Γ

VALUE	DOCUMENT ID		TECN	COMMENT
0.10 to 0.40 ($\approx$ 0.20) OUR ESTIMATE				
0.13±0.05	ANISOVICH	17C	DPWA	Multichannel
0.38±0.20	[1] KASHEVAROV	17	DPWA	$\gamma p \to \eta p, \eta' p$

[1] Assuming $A_{1/2} = -0.030$ GeV$^{-1/2}$.

$\Gamma(N\omega)/\Gamma_{total}$ $\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad$ Γ_4/Γ

VALUE (%)	DOCUMENT ID		TECN	COMMENT
28±12	DENISENKO	16	DPWA	Multichannel

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

VALUE (%)	DOCUMENT ID		TECN	COMMENT
18 ±5	ANISOVICH	12A	DPWA	Multichannel
1.8±0.8	[1] SHRESTHA	12A	DPWA	Multichannel

[1] Statistical error only.

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

VALUE (%)	DOCUMENT ID		TECN	COMMENT
13±7	ANISOVICH	12A	DPWA	Multichannel

$\Gamma(\Delta(1232)\pi,\,D\text{-wave})/\Gamma_{total}$ Γ_9/Γ

VALUE (%)	DOCUMENT ID		TECN	COMMENT
7±4	SOKHOYAN	15A	DPWA	Multichannel
7±3	[1] SHRESTHA	12A	DPWA	Multichannel
• • • We do not use the following data for averages, fits, limits, etc. • • •				
1±1	VRANA	00	DPWA	Multichannel

[1] Statistical error only.

$\Gamma(N\rho,\,S{=}1/2,\,S\text{-wave})/\Gamma_{total}$ Γ_{11}/Γ

VALUE (%)	DOCUMENT ID		TECN	COMMENT
< 2	[1] SHRESTHA	12A	DPWA	Multichannel
• • • We do not use the following data for averages, fits, limits, etc. • • •				
36±1	VRANA	00	DPWA	Multichannel

[1] Statistical error only.

$\Gamma(N\rho,\,S{=}3/2,\,D\text{-wave})/\Gamma_{total}$ Γ_{12}/Γ

VALUE (%)	DOCUMENT ID		TECN	COMMENT
9±3	[1] SHRESTHA	12A	DPWA	Multichannel
• • • We do not use the following data for averages, fits, limits, etc. • • •				
1±1	VRANA	00	DPWA	Multichannel

[1] Statistical error only.

$\Gamma(\Lambda K^*(892))/\Gamma_{total}$ Γ_{13}/Γ

VALUE	DOCUMENT ID		TECN	COMMENT
0.063±0.025	ANISOVICH	17B	DPWA	Multichannel

$\Gamma(N\sigma)/\Gamma_{total}$ Γ_{14}/Γ

VALUE (%)	DOCUMENT ID		TECN	COMMENT
<2	[1] SHRESTHA	12A	DPWA	Multichannel
• • • We do not use the following data for averages, fits, limits, etc. • • •				
2±1	VRANA	00	DPWA	Multichannel

[1] Statistical error only.

$\Gamma\big(N(1440)\pi\big)/\Gamma_{\text{total}}$ $\hfill \Gamma_{15}/\Gamma$

VALUE (%)	DOCUMENT ID		TECN	COMMENT
2.5±1.5	SOKHOYAN	15A	DPWA	Multichannel
24 ±4	[1] SHRESTHA	12A	DPWA	Multichannel
• • • We do not use the following data for averages, fits, limits, etc. • • •				
2 ±1	VRANA	00	DPWA	Multichannel

[1] Statistical error only.

N(1895) PHOTON DECAY AMPLITUDES AT THE POLE

$N(1895) \to p\gamma$, helicity-1/2 amplitude $A_{1/2}$

MODULUS (GeV$^{-1/2}$)	PHASE (°)	DOCUMENT ID		TECN	COMMENT
−0.015±0.006	−35 ± 35	ANISOVICH	17C	DPWA	Multichannel
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.015±0.006	145 ± 35	SOKHOYAN	15A	DPWA	Multichannel

N(1895) BREIT-WIGNER PHOTON DECAY AMPLITUDES

$N(1895) \to p\gamma$, helicity-1/2 amplitude $A_{1/2}$

VALUE (GeV$^{-1/2}$)	DOCUMENT ID		TECN	COMMENT
−0.016±0.006	SOKHOYAN	15A	DPWA	Multichannel
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.012±0.006	[1] SHRESTHA	12A	DPWA	Multichannel

[1] Statistical error only.

$N(1895) \to n\gamma$, helicity-1/2 amplitude $A_{1/2}$

VALUE (GeV$^{-1/2}$)	DOCUMENT ID		TECN	COMMENT
0.013±0.006	ANISOVICH	13B	DPWA	Multichannel
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.003±0.007	[1] SHRESTHA	12A	DPWA	Multichannel

[1] Statistical error only.

N(1895) REFERENCES

ANISOVICH	17A	PRL 119 062004	A.V. Anisovich *et al.*	
ANISOVICH	17B	PL B771 142	A.V. Anisovich *et al.*	
ANISOVICH	17C	PL B772 247	A.V. Anisovich *et al.*	
KASHEVAROV	17	PRL 118 212001	V.L. Kashevarov *et al.*	(A2/MAMI Collab.)
DENISENKO	16	PL B755 97	I. Denisenko *et al.*	
SOKHOYAN	15A	EPJ A51 95	V. Sokhoyan *et al.*	(CBELSA/TAPS Collab.)
SVARC	14	PR C89 045205	A. Svarc *et al.*	(RBI Zagreb, UNI Tuzla)
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 C85 055203	M. Shrestha, D.M. Manley	(KSU)
BATINIC	10	PR C82 038203	M. Batinic *et al.*	(ZAGR)
VRANA	00	PRPL 328 181	T.P. Vrana, S.A. Dytman, T.-S.H. Lee	(PITT, ANL)
CUTKOSKY	80	Toronto Conf. 19	R.E. Cutkosky *et al.*	(CMU, LBL) IJP
Also		PR D20 2839	R.E. Cutkosky *et al.*	(CMU, LBL)
HOEHLER	79	PDAT 12-1	G. Hohler *et al.*	(KARLT) IJP
Also		Toronto Conf. 3	R. Koch	(KARLT) IJP