$N(1895)\ 1/2^-$

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

OMITTED FROM SUMMARY TABLE

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.

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

N(1895) BREIT-WIGNER MASS

VALUE (MeV)	*DOCUMENT ID*		*TECN*	*COMMENT*
1895 ± 15	ANISOVICH	12A	DPWA	Multichannel
2180 ± 80	CUTKOSKY	80	IPWA	$\pi N \rightarrow \pi N$
1880 ± 20	HOEHLER	79	IPWA	$\pi N \rightarrow \pi N$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
1910 ± 15	SHRESTHA	12A	DPWA	Multichannel
1812 ± 25	BATINIC	10	DPWA	$\pi N \rightarrow N\pi,\ N\eta$
1822 ± 43	VRANA	00	DPWA	Multichannel
$1897 \pm 50\ ^{+30}_{-\ 2}$	PLOETZKE	98	SPEC	$\gamma p \rightarrow p\eta'(958)$
1928 ± 59	MANLEY	92	IPWA	$\pi N \rightarrow \pi N$ & $N\pi\pi$

N(1895) BREIT-WIGNER WIDTH

VALUE (MeV)	*DOCUMENT ID*		*TECN*	*COMMENT*
$90^{+\ 30}_{-\ 15}$	ANISOVICH	12A	DPWA	Multichannel
350 ± 100	CUTKOSKY	80	IPWA	$\pi N \rightarrow \pi N$
95 ± 30	HOEHLER	79	IPWA	$\pi N \rightarrow \pi N$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
502 ± 47	SHRESTHA	12A	DPWA	Multichannel
405 ± 40	BATINIC	10	DPWA	$\pi N \rightarrow N\pi,\ N\eta$
248 ± 185	VRANA	00	DPWA	Multichannel
$396 \pm 155\ ^{+35}_{-45}$	PLOETZKE	98	SPEC	$\gamma p \rightarrow p\eta'(958)$
414 ± 157	MANLEY	92	IPWA	$\pi N \rightarrow \pi N$ & $N\pi\pi$

N(1895) POLE POSITION

REAL PART

VALUE (MeV)	*DOCUMENT ID*		*TECN*	*COMMENT*
$1917 \pm 19 \pm 1$	[1] SVARC	14	MLS	$\pi N \rightarrow \pi N$
1900 ± 15	ANISOVICH	12A	DPWA	Multichannel
2150 ± 70	CUTKOSKY	80	IPWA	$\pi N \rightarrow \pi N$
1937 or 1949	[2] LONGACRE	78	IPWA	$\pi N \rightarrow N\pi\pi$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
1858	SHRESTHA	12A	DPWA	Multichannel
1797 ± 26	BATINIC	10	DPWA	$\pi N \rightarrow N\pi,\ N\eta$
1795	VRANA	00	DPWA	Multichannel

−2×IMAGINARY PART

VALUE (MeV)	*DOCUMENT ID*		*TECN*	*COMMENT*
101± 36±1	[1] SVARC	14	MLS	$\pi N \rightarrow \pi N$
$90^{+\ 30}_{-\ 15}$	ANISOVICH	12A	DPWA	Multichannel
350±100	CUTKOSKY	80	IPWA	$\pi N \rightarrow \pi N$
139 or 131	[2] LONGACRE	78	IPWA	$\pi N \rightarrow N\pi\pi$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
479	SHRESTHA	12A	DPWA	Multichannel
420± 45	BATINIC	10	DPWA	$\pi N \rightarrow N\pi$, $N\eta$
220	VRANA	00	DPWA	Multichannel

N(1895) ELASTIC POLE RESIDUE

MODULUS $|r|$

VALUE (MeV)	*DOCUMENT ID*		*TECN*	*COMMENT*
3.1± 1.4	[1] SVARC	14	MLS	$\pi N \rightarrow \pi N$
1 ± 1	ANISOVICH	12A	DPWA	Multichannel
40 ±20	CUTKOSKY	80	IPWA	$\pi N \rightarrow \pi N$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
60	BATINIC	10	DPWA	$\pi N \rightarrow N\pi$, $N\eta$

PHASE θ

VALUE (°)	*DOCUMENT ID*		*TECN*	*COMMENT*
−107±23±2	[1] SVARC	14	MLS	$\pi N \rightarrow \pi N$
0±90	CUTKOSKY	80	IPWA	$\pi N \rightarrow \pi N$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
−164	BATINIC	10	DPWA	$\pi N \rightarrow N\pi$, $N\eta$

N(1895) INELASTIC POLE RESIDUE

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

Normalized residue in $N\pi \rightarrow N(1895) \rightarrow N\eta$

MODULUS (%)	*PHASE (°)*	*DOCUMENT ID*		*TECN*	*COMMENT*
6±2	40 ± 20	ANISOVICH	12A	DPWA	Multichannel

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

MODULUS (%)	*PHASE (°)*	*DOCUMENT ID*		*TECN*	*COMMENT*
5±2	−90 ± 30	ANISOVICH	12A	DPWA	Multichannel

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

MODULUS (%)	*PHASE (°)*	*DOCUMENT ID*		*TECN*	*COMMENT*
6±2	40 ± 30	ANISOVICH	12A	DPWA	Multichannel

N(1895) DECAY MODES

	Mode
Γ_1	$N\pi$
Γ_2	$N\eta$
Γ_3	ΛK
Γ_4	ΣK
Γ_5	$N\pi\pi$
Γ_6	$\Delta\pi$
Γ_7	$\Delta(1232)\pi$, *D*-wave
Γ_8	$N\rho$
Γ_9	$N\rho$, S=1/2, *S*-wave
Γ_{10}	$N\rho$, S=3/2, *D*-wave
Γ_{11}	$N(\pi\pi)^{I=0}_{S\text{-wave}}$
Γ_{12}	$N(1440)\pi$
Γ_{13}	$p\gamma$, helicity=1/2
Γ_{14}	$n\gamma$, helicity=1/2

N(1895) BRANCHING RATIOS

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

VALUE (%)	*DOCUMENT ID*		*TECN*	*COMMENT*
2± 1	ANISOVICH	12A	DPWA	Multichannel
18± 8	CUTKOSKY	80	IPWA	$\pi N \to \pi N$
9± 5	HOEHLER	79	IPWA	$\pi N \to \pi N$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
17± 2	SHRESTHA	12A	DPWA	Multichannel
32± 6	BATINIC	10	DPWA	$\pi N \to N\pi$, $N\eta$
17± 3	VRANA	00	DPWA	Multichannel
10±10	MANLEY	92	IPWA	$\pi N \to \pi N$ & $N\pi\pi$

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

VALUE (%)	*DOCUMENT ID*		*TECN*	*COMMENT*
21± 6	ANISOVICH	12A	DPWA	Multichannel
41± 4	VRANA	00	DPWA	Multichannel
• • • We do not use the following data for averages, fits, limits, etc. • • •				
40± 4	SHRESTHA	12A	DPWA	Multichannel
22±10	BATINIC	10	DPWA	$\pi N \to N\pi$, $N\eta$

$\Gamma(\Lambda K)/\Gamma_{\text{total}}$ Γ_3/Γ

VALUE (%)	*DOCUMENT ID*		*TECN*	*COMMENT*
18 ±5	ANISOVICH	12A	DPWA	Multichannel
• • • We do not use the following data for averages, fits, limits, etc. • • •				
1.8±0.8	SHRESTHA	12A	DPWA	Multichannel

$(\Gamma_i\Gamma_f)^{1/2}/\Gamma_{total}$ in $N\pi \to N(1895) \to \Lambda K$ $(\Gamma_1\Gamma_3)^{1/2}/\Gamma$

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

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

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

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

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

$\Gamma(N\rho, S{=}1/2, S\text{-wave})/\Gamma_{total}$ Γ_9/Γ

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

$\Gamma(N\rho, S{=}3/2, D\text{-wave})/\Gamma_{total}$ Γ_{10}/Γ

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

$\Gamma(N(\pi\pi)^{I=0}_{S\text{-wave}})/\Gamma_{total}$ Γ_{11}/Γ

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

$\Gamma(N(1440)\pi)/\Gamma_{total}$ Γ_{12}/Γ

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

N(1895) PHOTON DECAY AMPLITUDES

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

VALUE ($GeV^{-1/2}$)	DOCUMENT ID		TECN	COMMENT
0.012±0.006	[3] ANISOVICH	12A	DPWA	Phase = (120 ± 50)°
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.012±0.006	SHRESTHA	12A	DPWA	Multichannel

$N(1895) \rightarrow n\gamma$, 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	SHRESTHA	12A	DPWA	Multichannel

N(1895) FOOTNOTES

[1] Fit to the amplitudes of HOEHLER 79.

[2] LONGACRE 78 values are from a search for poles in the unitarized T-matrix. The first (second) value uses, in addition to $\pi N \rightarrow N\pi\pi$ data, elastic amplitudes from a Saclay (CERN) partial-wave analysis.

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

N(1895) REFERENCES

SVARC	14	PR C89 045205	A. Svarc *et al.*	
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)
BATINIC	10	PR C82 038203	M. Batinic *et al.*	(ZAGR)
ARNDT	06	PR C74 045205	R.A. Arndt *et al.*	(GWU)
VRANA	00	PRPL 328 181	T.P. Vrana, S.A. Dytman,, T.-S.H. Lee	(PITT+)
PLOETZKE	98	PL B444 555	R. Ploetzke *et al.*	(Bonn SAPHIR Collab.)
MANLEY	92	PR D45 4002	D.M. Manley, E.M. Saleski	(KSA) IJP
Also		PR D30 904	D.M. Manley *et al.*	(VPI)
CUTKOSKY	80	Toronto Conf. 19	R.E. Cutkosky *et al.*	(CMU, LBL) IJP
Also		PR D20 2839	R.E. Cutkosky *et al.*	(CMU, LBL)
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
LONGACRE	78	PR D17 1795	R.S. Longacre *et al.*	(LBL, SLAC)