$N(1520)\ 3/2^{-}$

$I(J^P) = \frac{1}{2}(\frac{3}{2}^{-})$ Status: ✳✳✳✳

Most of the results published before 1975 were last included in our 1982 edition, Physics Letters **111B** 1 (1982). Some further obsolete results published before 1984 were last included in our 2006 edition, Journal of Physics **G33** 1 (2006).

$N(1520)$ BREIT-WIGNER MASS

VALUE (MeV)	DOCUMENT ID		TECN	COMMENT
1510 to 1520 ($\approx$ 1515) OUR ESTIMATE				
1505 ± 4	SHKLYAR	13	DPWA	Multichannel
1517 ± 3	ANISOVICH	12A	DPWA	Multichannel
1514.5± 0.2	ARNDT	06	DPWA	$\pi N \to \pi N,\ \eta N$
1525 ±10	CUTKOSKY	80	IPWA	$\pi N \to \pi N$
1519 ± 4	HOEHLER	79	IPWA	$\pi N \to \pi N$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
1512.6± 0.5	SHRESTHA	12A	DPWA	Multichannel
1524 ± 4	ANISOVICH	10	DPWA	Multichannel
1522 ± 8	BATINIC	10	DPWA	$\pi N \to N\pi,\ N\eta$
1520 ±10	THOMA	08	DPWA	Multichannel
1516.3± 0.8	ARNDT	04	DPWA	$\pi N \to \pi N,\ \eta N$
1509 ± 1	PENNER	02C	DPWA	Multichannel
1518 ± 3	VRANA	00	DPWA	Multichannel
1516 ±10	ARNDT	96	IPWA	$\gamma N \to \pi N$
1515	ARNDT	95	DPWA	$\pi N \to N\pi$
1510	LI	93	IPWA	$\gamma N \to \pi N$
1524 ± 4	MANLEY	92	IPWA	$\pi N \to \pi N$ & $N\pi\pi$
1510	[1] LONGACRE	77	IPWA	$\pi N \to N\pi\pi$
1520	[2] LONGACRE	75	IPWA	$\pi N \to N\pi\pi$

$N(1520)$ BREIT-WIGNER WIDTH

VALUE (MeV)	DOCUMENT ID		TECN	COMMENT
100 to 125 ($\approx$ 115) OUR ESTIMATE				
100 ± 2	SHKLYAR	13	DPWA	Multichannel
114 ± 5	ANISOVICH	12A	DPWA	Multichannel
103.6± 0.4	ARNDT	06	DPWA	$\pi N \to \pi N,\ \eta N$
120 ±15	CUTKOSKY	80	IPWA	$\pi N \to \pi N$
114 ± 7	HOEHLER	79	IPWA	$\pi N \to \pi N$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
117 ± 1	SHRESTHA	12A	DPWA	Multichannel
117 ± 6	ANISOVICH	10	DPWA	Multichannel
132 ±11	BATINIC	10	DPWA	$\pi N \to N\pi,\ N\eta$
125 ±15	THOMA	08	DPWA	Multichannel
98.6± 2.6	ARNDT	04	DPWA	$\pi N \to \pi N,\ \eta N$
100 ± 2	PENNER	02C	DPWA	Multichannel
124 ± 4	VRANA	00	DPWA	Multichannel

106	± 4		ARNDT	96	IPWA	$\gamma N \to \pi N$
106			ARNDT	95	DPWA	$\pi N \to N\pi$
120			LI	93	IPWA	$\gamma N \to \pi N$
124	± 8		MANLEY	92	IPWA	$\pi N \to \pi N$ & $N\pi\pi$
110		[1]	LONGACRE	77	IPWA	$\pi N \to N\pi\pi$
150		[2]	LONGACRE	75	IPWA	$\pi N \to N\pi\pi$

N(1520) POLE POSITION

REAL PART

VALUE (MeV)	DOCUMENT ID		TECN	COMMENT
1505 to 1515 (≈ 1510) OUR ESTIMATE				
$1506 \pm 1 \pm 1$	[3] SVARC	14	MLS	$\pi N \to \pi N$
1507 ± 3	ANISOVICH	12A	DPWA	Multichannel
1515	ARNDT	06	DPWA	$\pi N \to \pi N,\ \eta N$
1510	[4] HOEHLER	93	ARGD	$\pi N \to \pi N$
1510 ± 5	CUTKOSKY	80	IPWA	$\pi N \to \pi N$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
1492	SHKLYAR	13	DPWA	Multichannel
1501	SHRESTHA	12A	DPWA	Multichannel
1512 ± 3	ANISOVICH	10	DPWA	Multichannel
1506 ± 9	BATINIC	10	DPWA	$\pi N \to N\pi,\ N\eta$
1509 ± 7	THOMA	08	DPWA	Multichannel
1514	ARNDT	04	DPWA	$\pi N \to \pi N,\ \eta N$
1504	VRANA	00	DPWA	Multichannel
1515	ARNDT	95	DPWA	$\pi N \to N\pi$
1511	ARNDT	91	DPWA	$\pi N \to \pi N$ Soln SM90
1514 or 1511	[5] LONGACRE	78	IPWA	$\pi N \to N\pi\pi$
1508 or 1505	[1] LONGACRE	77	IPWA	$\pi N \to N\pi\pi$

−2×IMAGINARY PART

VALUE (MeV)	DOCUMENT ID		TECN	COMMENT
105 to 120 (≈ 110) OUR ESTIMATE				
$115 \pm 2 \pm 1$	[3] SVARC	14	MLS	$\pi N \to \pi N$
111 ± 5	ANISOVICH	12A	DPWA	Multichannel
113	ARNDT	06	DPWA	$\pi N \to \pi N,\ \eta N$
120	[4] HOEHLER	93	ARGD	$\pi N \to \pi N$
114 ± 10	CUTKOSKY	80	IPWA	$\pi N \to \pi N$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
94	SHKLYAR	13	DPWA	Multichannel
112	SHRESTHA	12A	DPWA	Multichannel
110 ± 6	ANISOVICH	10	DPWA	Multichannel
122 ± 9	BATINIC	10	DPWA	$\pi N \to N\pi,\ N\eta$
113 ± 12	THOMA	08	DPWA	Multichannel
102	ARNDT	04	DPWA	$\pi N \to \pi N,\ \eta N$
112	VRANA	00	DPWA	Multichannel
110	ARNDT	95	DPWA	$\pi N \to N\pi$
108	ARNDT	91	DPWA	$\pi N \to \pi N$ Soln SM90
146 or 137	[5] LONGACRE	78	IPWA	$\pi N \to N\pi\pi$
109 or 107	[1] LONGACRE	77	IPWA	$\pi N \to N\pi\pi$

N(1520) ELASTIC POLE RESIDUE

MODULUS |r|

VALUE (MeV)		DOCUMENT ID		TECN	COMMENT
35±3 OUR ESTIMATE					
33±1±1	[3] SVARC		14	MLS	$\pi N \to \pi N$
36±3	ANISOVICH		12A	DPWA	Multichannel
38	ARNDT		06	DPWA	$\pi N \to \pi N, \eta N$
32	HOEHLER		93	ARGD	$\pi N \to \pi N$
35±2	CUTKOSKY		80	IPWA	$\pi N \to \pi N$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
27	SHKLYAR		13	DPWA	Multichannel
35	BATINIC		10	DPWA	$\pi N \to N\pi, N\eta$
35	ARNDT		04	DPWA	$\pi N \to \pi N, \eta N$
34	ARNDT		95	DPWA	$\pi N \to N\pi$
33	ARNDT		91	DPWA	$\pi N \to \pi N$ Soln SM90

PHASE θ

VALUE (°)		DOCUMENT ID		TECN	COMMENT
−10±5 OUR ESTIMATE					
−15±1±1	[3] SVARC		14	MLS	$\pi N \to \pi N$
−14±3	ANISOVICH		12A	DPWA	Multichannel
− 5	ARNDT		06	DPWA	$\pi N \to \pi N, \eta N$
− 8	HOEHLER		93	ARGD	$\pi N \to \pi N$
−12±5	CUTKOSKY		80	IPWA	$\pi N \to \pi N$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
−35	SHKLYAR		13	DPWA	Multichannel
− 7	BATINIC		10	DPWA	$\pi N \to N\pi, N\eta$
− 6	ARNDT		04	DPWA	$\pi N \to \pi N, \eta N$
7	ARNDT		95	DPWA	$\pi N \to N\pi$
−10	ARNDT		91	DPWA	$\pi N \to \pi N$ Soln SM90

N(1520) INELASTIC POLE RESIDUE

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

Normalized residue in $N\pi \to N(1520) \to \Delta\pi$, S-wave

MODULUS (%)	PHASE (°)	DOCUMENT ID		TECN	COMMENT
33±5	**150 ± 20**	ANISOVICH	12A	DPWA	Multichannel

Normalized residue in $N\pi \to N(1520) \to \Delta\pi$, D-wave

MODULUS (%)	PHASE (°)	DOCUMENT ID		TECN	COMMENT
25±3	**100 ± 20**	ANISOVICH	12A	DPWA	Multichannel

N(1520) DECAY MODES

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

	Mode	Fraction (Γ_i/Γ)
Γ_1	$N\pi$	55–65 %
Γ_2	$N\eta$	$(2.3\pm0.4)\times 10^{-3}$
Γ_3	$N\pi\pi$	20–30 %
Γ_4	$\Delta\pi$	15–25 %
Γ_5	$\Delta(1232)\pi$, *S*-wave	10–20 %
Γ_6	$\Delta(1232)\pi$, *D*-wave	10–15 %
Γ_7	$N\rho$	15–25 %
Γ_8	$N\rho$, $S{=}3/2$, *S*-wave	(9.0 ± 1.0) %
Γ_9	$N(\pi\pi)_{S\text{-wave}}^{I=0}$	<8 %
Γ_{10}	$p\gamma$	0.31–0.52 %
Γ_{11}	$p\gamma$, helicity$=1/2$	0.01–0.02 %
Γ_{12}	$p\gamma$, helicity$=3/2$	0.30–0.50 %
Γ_{13}	$n\gamma$	0.30–0.53 %
Γ_{14}	$n\gamma$, helicity$=1/2$	0.04–0.10 %
Γ_{15}	$n\gamma$, helicity$=3/2$	0.25–0.45 %

N(1520) BRANCHING RATIOS

$\Gamma(N\pi)/\Gamma_{\text{total}}$ $\qquad\qquad\Gamma_1/\Gamma$

VALUE (%)	DOCUMENT ID		TECN	COMMENT
55 to 65 OUR ESTIMATE				
57 ±2	SHKLYAR	13	DPWA	Multichannel
62 ±3	ANISOVICH	12A	DPWA	Multichannel
63.2±0.1	ARNDT	06	DPWA	$\pi N \to \pi N, \eta N$
58 ±3	CUTKOSKY	80	IPWA	$\pi N \to \pi N$
54 ±3	HOEHLER	79	IPWA	$\pi N \to \pi N$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
62.7±0.5	SHRESTHA	12A	DPWA	Multichannel
57 ±5	ANISOVICH	10	DPWA	Multichannel
55 ±5	BATINIC	10	DPWA	$\pi N \to N\pi, N\eta$
58 ±8	THOMA	08	DPWA	Multichannel
64.0±0.5	ARNDT	04	DPWA	$\pi N \to \pi N, \eta N$
56 ±1	PENNER	02C	DPWA	Multichannel
63 ±2	VRANA	00	DPWA	Multichannel
61	ARNDT	95	DPWA	$\pi N \to N\pi$
59 ±3	MANLEY	92	IPWA	$\pi N \to \pi N$ & $N\pi\pi$

$\Gamma(N\eta)/\Gamma_{\text{total}}$ $\qquad\qquad\Gamma_2/\Gamma$

VALUE (%)	DOCUMENT ID		TECN	COMMENT
0.23$\pm$0.04 OUR AVERAGE				
0 ±1	SHKLYAR	13	DPWA	Multichannel
0.23±0.04	PENNER	02C	DPWA	Multichannel
0 ±1	VRANA	00	DPWA	Multichannel

• • • We do not use the following data for averages, fits, limits, etc. • • •

0.1 $\pm$0.1	BATINIC	10	DPWA	$\pi N \rightarrow N\pi, N\eta$
0.2 $\pm$0.1	THOMA	08	DPWA	Multichannel
0.08 to 0.12	ARNDT	05	DPWA	Multichannel
0.08$\pm$0.01	TIATOR	99	DPWA	$\gamma p \rightarrow p\eta$

Note: Signs of couplings from $\pi N \rightarrow N\pi\pi$ analyses were changed in the 1986 edition to agree with the baryon-first convention; the overall phase ambiguity is resolved by choosing a negative sign for the $\Delta(1620)$ S_{31} coupling to $\Delta(1232)\pi$.

$(\Gamma_i\Gamma_f)^{1/2}/\Gamma_{\text{total}}$ in $N\pi \rightarrow N(1520) \rightarrow \Delta(1232)\pi$, S-wave $\qquad (\Gamma_1\Gamma_5)^{1/2}/\Gamma$

VALUE	DOCUMENT ID		TECN	COMMENT
−0.26 to −0.20 OUR ESTIMATE				
−0.26	[1,6] LONGACRE	77	IPWA	$\pi N \rightarrow N\pi\pi$
−0.24	[2] LONGACRE	75	IPWA	$\pi N \rightarrow N\pi\pi$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
−0.18$\pm$0.05	MANLEY	92	IPWA	$\pi N \rightarrow \pi N \& N\pi\pi$

$\Gamma(\Delta(1232)\pi, \text{S-wave})/\Gamma_{\text{total}}$ $\qquad\qquad\qquad\qquad\qquad \Gamma_5/\Gamma$

VALUE (%)	DOCUMENT ID		TECN	COMMENT
10 to 20 OUR ESTIMATE				
19 $\pm$4	ANISOVICH	12A	DPWA	Multichannel
15 $\pm$2	VRANA	00	DPWA	Multichannel
• • • We do not use the following data for averages, fits, limits, etc. • • •				
9.3$\pm$0.7	SHRESTHA	12A	DPWA	Multichannel
12 $\pm$4	THOMA	08	DPWA	Multichannel

$(\Gamma_i\Gamma_f)^{1/2}/\Gamma_{\text{total}}$ in $N\pi \rightarrow N(1520) \rightarrow \Delta(1232)\pi$, D-wave $\qquad (\Gamma_1\Gamma_6)^{1/2}/\Gamma$

VALUE	DOCUMENT ID		TECN	COMMENT
−0.28 to −0.24 OUR ESTIMATE				
−0.21	[1,6] LONGACRE	77	IPWA	$\pi N \rightarrow N\pi\pi$
−0.30	[2] LONGACRE	75	IPWA	$\pi N \rightarrow N\pi\pi$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
−0.29$\pm$0.03	MANLEY	92	IPWA	$\pi N \rightarrow \pi N \& N\pi\pi$

$\Gamma(\Delta(1232)\pi, \text{D-wave})/\Gamma_{\text{total}}$ $\qquad\qquad\qquad\qquad\qquad \Gamma_6/\Gamma$

VALUE (%)	DOCUMENT ID		TECN	COMMENT
10 to 15 OUR ESTIMATE				
9 $\pm$2	ANISOVICH	12A	DPWA	Multichannel
11 $\pm$2	VRANA	00	DPWA	Multichannel
• • • We do not use the following data for averages, fits, limits, etc. • • •				
6.3$\pm$0.5	SHRESTHA	12A	DPWA	Multichannel
14 $\pm$5	THOMA	08	DPWA	Multichannel

$(\Gamma_i\Gamma_f)^{1/2}/\Gamma_{total}$ in $N\pi \to N(1520) \to N\rho$, S=3/2, S-wave $\qquad (\Gamma_1\Gamma_8)^{1/2}/\Gamma$

VALUE		DOCUMENT ID		TECN	COMMENT
−0.35 to −0.31 OUR ESTIMATE					
−0.35	[1,6]	LONGACRE	77	IPWA	$\pi N \to N\pi\pi$
−0.24	[2]	LONGACRE	75	IPWA	$\pi N \to N\pi\pi$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
−0.35±0.03		MANLEY	92	IPWA	$\pi N \to \pi N$ & $N\pi\pi$

$\Gamma(N\rho, S=3/2, S\text{-wave})/\Gamma_{total}$ $\qquad \Gamma_8/\Gamma$

VALUE (%)	DOCUMENT ID		TECN	COMMENT
9 ±1	VRANA	00	DPWA	Multichannel
• • • We do not use the following data for averages, fits, limits, etc. • • •				
20.9±0.7	SHRESTHA	12A	DPWA	Multichannel

$(\Gamma_i\Gamma_f)^{1/2}/\Gamma_{total}$ in $N\pi \to N(1520) \to N(\pi\pi)^{I=0}_{S\text{-wave}}$ $\qquad (\Gamma_1\Gamma_9)^{1/2}/\Gamma$

VALUE		DOCUMENT ID		TECN	COMMENT
−0.22 to −0.06 OUR ESTIMATE					
−0.13	[1,6]	LONGACRE	77	IPWA	$\pi N \to N\pi\pi$
−0.17	[2]	LONGACRE	75	IPWA	$\pi N \to N\pi\pi$

$\Gamma(N(\pi\pi)^{I=0}_{S\text{-wave}})/\Gamma_{total}$ $\qquad \Gamma_9/\Gamma$

VALUE (%)	DOCUMENT ID		TECN	COMMENT
1±1	VRANA	00	DPWA	Multichannel
• • • We do not use the following data for averages, fits, limits, etc. • • •				
<1	SHRESTHA	12A	DPWA	Multichannel
<4	THOMA	08	DPWA	Multichannel

N(1520) PHOTON DECAY AMPLITUDES

Papers on γN amplitudes predating 1981 may be found in our 2006 edition, Journal of Physics **G33** 1 (2006).

$N(1520) \to p\gamma$, helicity-1/2 amplitude $A_{1/2}$

VALUE (GeV$^{-1/2}$)		DOCUMENT ID		TECN	COMMENT
−0.020±0.005 OUR ESTIMATE					
−0.022±0.004		ANISOVICH	12A	DPWA	Multichannel
−0.019±0.002		WORKMAN	12A	DPWA	$\gamma N \to N\pi$
−0.028±0.002		DUGGER	07	DPWA	$\gamma N \to \pi N$
−0.038±0.003		AHRENS	02	DPWA	$\gamma N \to \pi N$
−0.028±0.014		CRAWFORD	83	IPWA	$\gamma N \to \pi N$
−0.007±0.004		AWAJI	81	DPWA	$\gamma N \to \pi N$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
−0.015±0.001		SHKLYAR	13	DPWA	Multichannel
−0.034±0.001		SHRESTHA	12A	DPWA	Multichannel
−0.032±0.006		ANISOVICH	10	DPWA	Multichannel
−0.027		DRECHSEL	07	DPWA	$\gamma N \to \pi N$
−0.003		PENNER	02D	DPWA	Multichannel
−0.052±0.010±0.007	[7]	MUKHOPAD...	98		$\gamma p \to \eta p$
−0.020±0.007		ARNDT	96	IPWA	$\gamma N \to \pi N$
−0.020±0.002		LI	93	IPWA	$\gamma N \to \pi N$
−0.012		WADA	84	DPWA	Compton scattering

$N(1520) \rightarrow p\gamma$, helicity-3/2 amplitude $A_{3/2}$

VALUE (GeV$^{-1/2}$)	DOCUMENT ID		TECN	COMMENT
0.140±0.010 OUR ESTIMATE				
0.131±0.010	ANISOVICH	12A	DPWA	Multichannel
0.141±0.002	WORKMAN	12A	DPWA	$\gamma N \rightarrow N\pi$
0.143±0.002	DUGGER	07	DPWA	$\gamma N \rightarrow \pi N$
0.147±0.010	AHRENS	02	DPWA	$\gamma N \rightarrow \pi N$
0.156±0.022	CRAWFORD	83	IPWA	$\gamma N \rightarrow \pi N$
0.168±0.013	AWAJI	81	DPWA	$\gamma N \rightarrow \pi N$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.146±0.001	SHKLYAR	13	DPWA	Multichannel
0.127±0.003	SHRESTHA	12A	DPWA	Multichannel
0.138±0.008	ANISOVICH	10	DPWA	Multichannel
0.161	DRECHSEL	07	DPWA	$\gamma N \rightarrow \pi N$
0.151	PENNER	02D	DPWA	Multichannel
0.130±0.020±0.015	[7] MUKHOPAD...	98		$\gamma p \rightarrow \eta p$
0.167±0.005	ARNDT	96	IPWA	$\gamma N \rightarrow \pi N$
0.167±0.002	LI	93	IPWA	$\gamma N \rightarrow \pi N$
0.168	WADA	84	DPWA	Compton scattering

$N(1520) \rightarrow n\gamma$, helicity-1/2 amplitude $A_{1/2}$

VALUE (GeV$^{-1/2}$)	DOCUMENT ID		TECN	COMMENT
−0.050±0.010 OUR ESTIMATE				
−0.049±0.008	ANISOVICH	13B	DPWA	Multichannel
−0.046±0.006	CHEN	12A	DPWA	$\gamma N \rightarrow \pi N$
−0.066±0.013	AWAJI	81	DPWA	$\gamma N \rightarrow \pi N$
−0.067±0.004	FUJII	81	DPWA	$\gamma N \rightarrow \pi N$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
−0.038±0.003	SHRESTHA	12A	DPWA	Multichannel
−0.077	DRECHSEL	07	DPWA	$\gamma N \rightarrow \pi N$
−0.084	PENNER	02D	DPWA	Multichannel
−0.048±0.008	ARNDT	96	IPWA	$\gamma N \rightarrow \pi N$
−0.058±0.003	LI	93	IPWA	$\gamma N \rightarrow \pi N$

$N(1520) \rightarrow n\gamma$, helicity-3/2 amplitude $A_{3/2}$

VALUE (GeV$^{-1/2}$)	DOCUMENT ID		TECN	COMMENT
−0.115±0.010 OUR ESTIMATE				
−0.113±0.012	ANISOVICH	13B	DPWA	Multichannel
−0.115±0.005	CHEN	12A	DPWA	$\gamma N \rightarrow \pi N$
−0.124±0.009	AWAJI	81	DPWA	$\gamma N \rightarrow \pi N$
−0.158±0.003	FUJII	81	DPWA	$\gamma N \rightarrow \pi N$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
−0.101±0.004	SHRESTHA	12A	DPWA	Multichannel
−0.154	DRECHSEL	07	DPWA	$\gamma N \rightarrow \pi N$
−0.159	PENNER	02D	DPWA	Multichannel
−0.140±0.010	ARNDT	96	IPWA	$\gamma N \rightarrow \pi N$
−0.131±0.003	LI	93	IPWA	$\gamma N \rightarrow \pi N$

N(1520) FOOTNOTES

[1] LONGACRE 77 pole positions are from a search for poles in the unitarized T-matrix; the first (second) value uses, in addition to $\pi N \to N\pi\pi$ data, elastic amplitudes from a Saclay (CERN) partial-wave analysis. The other LONGACRE 77 values are from eyeball fits with Breit-Wigner circles to the T-matrix amplitudes.

[2] From method II of LONGACRE 75: eyeball fits with Breit-Wigner circles to the T-matrix amplitudes.

[3] Fit to the amplitudes of HOEHLER 79.

[4] 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.

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

[6] LONGACRE 77 considers this coupling to be well determined.

[7] MUKHOPADHYAY 98 uses an effective Lagrangian approach to analyze η photoproduction data. The *ratio* of the $A_{3/2}$ and $A_{1/2}$ amplitudes is determined, with less model dependence than the amplitudes themselves, to be $A_{3/2}/A_{1/2} = -2.5 \pm 0.5 \pm 0.4$.

N(1520) REFERENCES

For early references, see Physics Letters **111B** 1 (1982). For very early references, see Reviews of Modern Physics **37** 633 (1965).

SVARC	14	PR C89 045205	A. Svarc et al.	
ANISOVICH	13B	EPJ A49 67	A.V. Anisovich et al.	
SHKLYAR	13	PR C87 015201	V. Shklyar, H. Lenske, U. Mosel	(GIES)
ANISOVICH	12A	EPJ A48 15	A.V. Anisovich et al.	(BONN, PNPI)
CHEN	12A	PR C86 015206	W. Chen et al.	(DUKE, GWU, MSST, ITEP+)
SHRESTHA	12A	PR C86 055203	M. Shrestha, D.M. Manley	(KSU)
WORKMAN	12A	PR C86 015202	R. Workman et al.	(GWU)
ANISOVICH	10	EPJ A44 203	A.V. Anisovich et al.	(BONN, PNPI)
BATINIC	10	PR C82 038203	M. Batinic et al.	(ZAGR)
THOMA	08	PL B659 87	U. Thoma et al.	(CB-ELSA Collab.)
DRECHSEL	07	EPJ A34 69	D. Drechsel, S.S. Kamalov, L. Tiator	(MAINZ, JINR)
DUGGER	07	PR C76 025211	M. Dugger et al.	(Jefferson Lab CLAS Collab.)
ARNDT	06	PR C74 045205	R.A. Arndt et al.	(GWU)
PDG	06	JP G33 1	W.-M. Yao et al.	(PDG Collab.)
ARNDT	05	PR C72 045202	R.A. Arndt et al.	(GWU, PNPI)
ARNDT	04	PR C69 035213	R.A. Arndt et al.	(GWU, TRIU)
AHRENS	02	PRL 88 232002	J. Ahrens et al.	(Mainz MAMI GDH/A2 Collab.)
PENNER	02C	PR C66 055211	G. Penner, U. Mosel	(GIES)
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ARNDT	96	PR C53 430	R.A. Arndt, I.I. Strakovsky, R.L. Workman	(VPI)
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WADA	84	NP B247 313	Y. Wada et al.	(INUS)
CRAWFORD	83	NP B211 1	R.L. Crawford, W.T. Morton	(GLAS)
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AWAJI	81	Bonn Conf. 352	N. Awaji, R. Kajikawa	(NAGO)
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CUTKOSKY	80	Toronto Conf. 19	R.E. Cutkosky et al.	(CMU, LBL) IJP
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LONGACRE	77	NP B122 493	R.S. Longacre, J. Dolbeau	(SACL) IJP
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