

**$N(1520) \ 3/2^-$**  $I(J^P) = \frac{1}{2}(\frac{3}{2}^-)$  Status: \*\*\*\*Older and obsolete values are listed and referenced in the 2014 edition, Chinese Physics **C38** 070001 (2014). **$N(1520)$  POLE POSITION****REAL PART**

<i>VALUE (MeV)</i>	<i>DOCUMENT ID</i>	<i>TECN</i>	<i>COMMENT</i>
<b>1505 to 1515 (<math>\approx</math> 1510) OUR ESTIMATE</b>			
1506 $\pm$ 2	SARANTSEV	25	DPWA Multichannel
1482 $\pm$ 3	ROENCHEN	22	DPWA Multichannel
1506 $\pm$ 1 $\pm$ 1	<sup>1</sup> SVARC	14	L+P $\pi N \rightarrow \pi N$
1510 $\pm$ 5	CUTKOSKY	80	IPWA $\pi N \rightarrow \pi N$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●			
1500	HUNT	19	DPWA Multichannel
1512	ROENCHEN	15A	DPWA Multichannel
1507 $\pm$ 2	SOKHOYAN	15A	DPWA Multichannel
1492	SHKLYAR	13	DPWA Multichannel
1506 $\pm$ 9	BATINIC	10	DPWA $\pi N \rightarrow N\pi, N\eta$
1515	ARNDT	06	DPWA $\pi N \rightarrow \pi N, \eta N$
1504	VRANA	00	DPWA Multichannel
1510	HOEHLER	93	ARGD $\pi N \rightarrow \pi N$

<sup>1</sup> Fit to the amplitudes of HOEHLER 79.**-2 $\times$ IMAGINARY PART**

<i>VALUE (MeV)</i>	<i>DOCUMENT ID</i>	<i>TECN</i>	<i>COMMENT</i>
<b>105 to 120 (<math>\approx</math> 110) OUR ESTIMATE</b>			
112 $\pm$ 3	SARANTSEV	25	DPWA Multichannel
126 $\pm$ 9	ROENCHEN	22	DPWA Multichannel
115 $\pm$ 2 $\pm$ 1	<sup>1</sup> SVARC	14	L+P $\pi N \rightarrow \pi N$
114 $\pm$ 10	CUTKOSKY	80	IPWA $\pi N \rightarrow \pi N$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●			
117	HUNT	19	DPWA Multichannel
89	ROENCHEN	15A	DPWA Multichannel
111 $\pm$ 3	SOKHOYAN	15A	DPWA Multichannel
94	SHKLYAR	13	DPWA Multichannel
122 $\pm$ 9	BATINIC	10	DPWA $\pi N \rightarrow N\pi, N\eta$
113	ARNDT	06	DPWA $\pi N \rightarrow \pi N, \eta N$
112	VRANA	00	DPWA Multichannel
120	HOEHLER	93	ARGD $\pi N \rightarrow \pi N$

<sup>1</sup> Fit to the amplitudes of HOEHLER 79.

**$N(1520)$  ELASTIC POLE RESIDUE****MODULUS  $|r|$** 

<u>VALUE (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>32 to 38 (<math>\approx 35</math>) OUR ESTIMATE</b>			
$27 \pm 11$	ROENCHEN	22	DPWA Multichannel
$36 \pm 2$	SOKHOYAN	15A	DPWA Multichannel
$33 \pm 1 \pm 1$	<sup>1</sup> SVARC	14	L+P $\pi N \rightarrow \pi N$
$35 \pm 2$	CUTKOSKY	80	IPWA $\pi N \rightarrow \pi N$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●			
37	ROENCHEN	15A	DPWA Multichannel
27	SHKLYAR	13	DPWA Multichannel
$36 \pm 3$	ANISOVICH	12A	DPWA Multichannel
35	BATINIC	10	DPWA $\pi N \rightarrow N\pi, N\eta$
38	ARNDT	06	DPWA $\pi N \rightarrow \pi N, \eta N$
32	HOEHLER	93	ARGD $\pi N \rightarrow \pi N$

<sup>1</sup> Fit to the amplitudes of HOEHLER 79.**PHASE  $\theta$** 

<u>VALUE (<math>^\circ</math>)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>-15 to -5 (<math>\approx -10</math>) OUR ESTIMATE</b>			
$-36 \pm 24$	ROENCHEN	22	DPWA Multichannel
$-14 \pm 3$	SOKHOYAN	15A	DPWA Multichannel
$-15 \pm 1 \pm 1$	<sup>1</sup> SVARC	14	L+P $\pi N \rightarrow \pi N$
$-12 \pm 5$	CUTKOSKY	80	IPWA $\pi N \rightarrow \pi N$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●			
- 6	ROENCHEN	15A	DPWA Multichannel
-35	SHKLYAR	13	DPWA Multichannel
$-14 \pm 3$	ANISOVICH	12A	DPWA Multichannel
- 7	BATINIC	10	DPWA $\pi N \rightarrow N\pi, N\eta$
- 5	ARNDT	06	DPWA $\pi N \rightarrow \pi N, \eta N$
- 8	HOEHLER	93	ARGD $\pi N \rightarrow \pi N$

<sup>1</sup> Fit to the amplitudes of HOEHLER 79. **$N(1520)$  INELASTIC POLE RESIDUE**The "normalized residue" is the residue divided by  $\Gamma_{pole}/2$ .**Normalized residue in  $N\pi \rightarrow N(1520) \rightarrow \Delta\pi$ , S-wave**

<u>MODULUS</u>	<u>PHASE (<math>^\circ</math>)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
$0.33 \pm 0.04$	$155 \pm 15$	SOKHOYAN	15A	DPWA Multichannel
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●				
$0.33 \pm 0.05$	$150 \pm 20$	ANISOVICH	12A	DPWA Multichannel

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

<u>MODULUS</u>	<u>PHASE (<math>^\circ</math>)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
$0.25 \pm 0.03$	$105 \pm 18$	SOKHOYAN	15A	DPWA Multichannel
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●				
$0.25 \pm 0.03$	$100 \pm 20$	ANISOVICH	12A	DPWA Multichannel

**Normalized residue in  $N\pi \rightarrow N(1520) \rightarrow N\eta$**

<u>MODULUS</u>	<u>PHASE (<math>^\circ</math>)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
$0.021 \pm 0.009$	$34 \pm 27$	ROENCHEN	22	DPWA Multichannel
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.026	95	ROENCHEN	15A	DPWA Multichannel

**Normalized residue in  $N\pi \rightarrow N(1520) \rightarrow \Lambda K$**

<u>MODULUS</u>	<u>PHASE (<math>^\circ</math>)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
$0.026 \pm 0.010$	$127 \pm 24$	ROENCHEN	22	DPWA Multichannel
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.069	158	ROENCHEN	15A	DPWA Multichannel

**Normalized residue in  $N\pi \rightarrow N(1520) \rightarrow \Sigma K$**

<u>MODULUS</u>	<u>PHASE (<math>^\circ</math>)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
$0.010 \pm 0.006$	$94 \pm 34$	ROENCHEN	22	DPWA Multichannel
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.049	-41	ROENCHEN	15A	DPWA Multichannel

**Normalized residue in  $N\pi \rightarrow N(1520) \rightarrow N\sigma$**

<u>MODULUS</u>	<u>PHASE (<math>^\circ</math>)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
$0.08 \pm 0.03$	$-45 \pm 25$	SOKHOYAN	15A	DPWA Multichannel

**$N(1520)$  BREIT-WIGNER MASS**

<u>VALUE (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>1510 to 1520 (<math>\approx 1515</math>) OUR ESTIMATE</b>			
1515 $\pm 3$	SARANTSEV	25	DPWA Multichannel
1512.0 $\pm 1.5$	<sup>1</sup> HUNT	19	DPWA Multichannel
1505 $\pm 4$	<sup>1</sup> SHKLYAR	13	DPWA Multichannel
1514.5 $\pm 0.2$	<sup>1</sup> ARNDT	06	DPWA $\pi N \rightarrow \pi N, \eta N$
1525 $\pm 10$	CUTKOSKY	80	IPWA $\pi N \rightarrow \pi N$
1519 $\pm 4$	HOEHLER	79	IPWA $\pi N \rightarrow \pi N$
• • • We do not use the following data for averages, fits, limits, etc. • • •			
1516 $\pm 2$	SOKHOYAN	15A	DPWA Multichannel
1512.6 $\pm 0.5$	<sup>1</sup> SHRESTHA	12A	DPWA Multichannel
1522 $\pm 8$	BATINIC	10	DPWA $\pi N \rightarrow N\pi, N\eta$
1509 $\pm 1$	PENNER	02C	DPWA Multichannel
1518 $\pm 3$	VRANA	00	DPWA Multichannel

<sup>1</sup>Statistical error only.

**$N(1520)$  BREIT-WIGNER WIDTH**

<u>VALUE (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>100 to 120 (<math>\approx 110</math>) OUR ESTIMATE</b>			
114 $\pm 4$	SARANTSEV	25	DPWA Multichannel
121 $\pm 3$	<sup>1</sup> HUNT	19	DPWA Multichannel
100 $\pm 2$	<sup>1</sup> SHKLYAR	13	DPWA Multichannel
103.6 $\pm 0.4$	<sup>1</sup> ARNDT	06	DPWA $\pi N \rightarrow \pi N, \eta N$
120 $\pm 15$	CUTKOSKY	80	IPWA $\pi N \rightarrow \pi N$
114 $\pm 7$	HOEHLER	79	IPWA $\pi N \rightarrow \pi N$

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

113 ± 4	SOKHOYAN	15A	DPWA	Multichannel
117 ± 1	<sup>1</sup> SHRESTHA	12A	DPWA	Multichannel
132 ± 11	BATINIC	10	DPWA	$\pi N \rightarrow N\pi, N\eta$
100 ± 2	PENNER	02C	DPWA	Multichannel
124 ± 4	VRANA	00	DPWA	Multichannel

<sup>1</sup>Statistical error only.

## N(1520) DECAY MODES

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

Mode	Fraction ( $\Gamma_i/\Gamma$ )
$\Gamma_1$ $N\pi$	55–65 %
$\Gamma_2$ $N\eta$	0.07–0.09 %
$\Gamma_3$ $N\pi\pi$	25–35 %
$\Gamma_4$ $\Delta(1232)\pi$	22–34 %
$\Gamma_5$ $\Delta(1232)\pi, S\text{-wave}$	15–23 %
$\Gamma_6$ $\Delta(1232)\pi, D\text{-wave}$	7–11 %
$\Gamma_7$ $N\rho$	10–16 %
$\Gamma_8$ $N\rho, S=1/2$	0.2–0.4 %
$\Gamma_9$ $N\rho, S=3/2, S\text{-wave}$	10–16 %
$\Gamma_{10}$ $N\rho, S=3/2, D\text{-wave}$	<1 %
$\Gamma_{11}$ $N\sigma$	<10 %
$\Gamma_{12}$ $N(1440)\pi$	
$\Gamma_{13}$ $p\gamma$	0.31–0.52 %
$\Gamma_{14}$ $p\gamma, \text{helicity}=1/2$	0.01–0.02 %
$\Gamma_{15}$ $p\gamma, \text{helicity}=3/2$	0.30–0.50 %
$\Gamma_{16}$ $n\gamma$	0.30–0.53 %
$\Gamma_{17}$ $n\gamma, \text{helicity}=1/2$	0.04–0.10 %
$\Gamma_{18}$ $n\gamma, \text{helicity}=3/2$	0.25–0.45 %

## N(1520) BRANCHING RATIOS

$\Gamma(N\pi)/\Gamma_{\text{total}}$					$\Gamma_1/\Gamma$
VALUE (%)	DOCUMENT ID	TECN	COMMENT		
<b>55 to 65 (<math>\approx 60</math>) OUR ESTIMATE</b>					
61 ± 3	SEIFEN	25	DPWA	Multichannel	
58.3 ± 1.5	<sup>1</sup> HUNT	19	DPWA	Multichannel	
57 ± 2	<sup>1</sup> SHKLYAR	13	DPWA	Multichannel	
63.2 ± 0.1	<sup>1</sup> ARNDT	06	DPWA	$\pi N \rightarrow \pi N, \eta N$	
58 ± 3	CUTKOSKY	80	IPWA	$\pi N \rightarrow \pi N$	
54 ± 3	HOEHLER	79	IPWA	$\pi N \rightarrow \pi N$	
• • • We do not use the following data for averages, fits, limits, etc. • • •					
61 ± 2	SOKHOYAN	15A	DPWA	Multichannel	
62.7 ± 0.5	<sup>1</sup> SHRESTHA	12A	DPWA	Multichannel	

55 ±5	BATINIC	10	DPWA	$\pi N \rightarrow N\pi, N\eta$
56 ±1	PENNER	02C	DPWA	Multichannel
63 ±2	VRANA	00	DPWA	Multichannel

<sup>1</sup>Statistical error only.

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

<u>VALUE (%)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<0.1	MUELLER	20	DPWA Multichannel
0.03±0.01	<sup>1</sup> HUNT	19	DPWA Multichannel
0.08±0.01	TIATOR	99	DPWA $\gamma p \rightarrow p\eta$

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

<1	SHKLYAR	13	DPWA Multichannel
0.1 ±0.1	BATINIC	10	DPWA $\pi N \rightarrow N\pi, N\eta$
0.2 ±0.1	THOMA	08	DPWA Multichannel
0.08 to 0.12	ARNDT	05	DPWA Multichannel
0.23±0.04	PENNER	02C	DPWA Multichannel
0 ±1	VRANA	00	DPWA Multichannel

<sup>1</sup>Statistical error only.

**$\Gamma(\Delta(1232)\pi)/\Gamma_{\text{total}}$   $\Gamma_4/\Gamma$**

<u>VALUE (%)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>26±6</b>	SARANTSEV	25	DPWA Multichannel

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

<u>VALUE (%)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
12 ±4	SARANTSEV	25	DPWA Multichannel
10 ±4	SEIFEN	25	DPWA Multichannel
12.1±2.1	ADAMCZEW...	20	DPWA Multichannel
21 ±2	<sup>1</sup> HUNT	19	DPWA Multichannel

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

19 ±4	SOKHOYAN	15A	DPWA Multichannel
9.3±0.7	<sup>1</sup> SHRESTHA	12A	DPWA Multichannel
15 ±2	VRANA	00	DPWA Multichannel

<sup>1</sup>Statistical error only.

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

<u>VALUE (%)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
14 ±4	SARANTSEV	25	DPWA Multichannel
10 ±3	SEIFEN	25	DPWA Multichannel
6 ±2	ADAMCZEW...	20	DPWA Multichannel
6 ±1	<sup>1</sup> HUNT	19	DPWA Multichannel

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

9 ±2	SOKHOYAN	15A	DPWA Multichannel
6.3±0.5	<sup>1</sup> SHRESTHA	12A	DPWA Multichannel
11 ±2	VRANA	00	DPWA Multichannel

<sup>1</sup>Statistical error only.

$\Gamma(N\rho)/\Gamma_{\text{total}}$				$\Gamma_7/\Gamma$
VALUE (%)	DOCUMENT ID	TECN	COMMENT	
<b>28±4</b>	SARANTSEV 25	DPWA	Multichannel	
$\Gamma(N\rho, S=1/2)/\Gamma_{\text{total}}$				$\Gamma_8/\Gamma$
VALUE (%)	DOCUMENT ID	TECN	COMMENT	
<b>0.2–0.4 % OUR EVALUATION</b>				
4 ±3	SARANTSEV 25	DPWA	Multichannel	
0.4±0.2	ADAMCZEW... 20	DPWA	Multichannel	
$\Gamma(N\rho, S=3/2, S\text{-wave})/\Gamma_{\text{total}}$				$\Gamma_9/\Gamma$
VALUE (%)	DOCUMENT ID	TECN	COMMENT	
<b>10–16 % OUR EVALUATION</b>				
24 ±3	SARANTSEV 25	DPWA	Multichannel	
11.8±1.9	ADAMCZEW... 20	DPWA	Multichannel	
14.1±1.5	<sup>1</sup> HUNT 19	DPWA	Multichannel	
<sup>1</sup> Statistical error only				
$\Gamma(N\rho, S=3/2, D\text{-wave})/\Gamma_{\text{total}}$				$\Gamma_{10}/\Gamma$
VALUE (%)	DOCUMENT ID	TECN	COMMENT	
<b>&lt;1</b>	SARANTSEV 25	DPWA	Multichannel	
$\Gamma(N\sigma)/\Gamma_{\text{total}}$				$\Gamma_{11}/\Gamma$
VALUE (%)	DOCUMENT ID	TECN	COMMENT	
<b>&lt;10 % OUR ESTIMATE</b>				
<2	SARANTSEV 25	DPWA	Multichannel	
<2	SEIFEN 25	DPWA	Multichannel	
7 ±3	ADAMCZEW... 20	DPWA	Multichannel	
<0.7	<sup>1</sup> HUNT 19	DPWA	Multichannel	
• • • We do not use the following data for averages, fits, limits, etc. • • •				
<2	SOKHOYAN 15A	DPWA	Multichannel	
<1	<sup>1</sup> SHRESTHA 12A	DPWA	Multichannel	
<4	THOMA 08	DPWA	Multichannel	
1 ±1	VRANA 00	DPWA	Multichannel	
<sup>1</sup> Statistical error only.				
$\Gamma(N(1440)\pi)/\Gamma_{\text{total}}$				$\Gamma_{12}/\Gamma$
VALUE (%)	DOCUMENT ID	TECN	COMMENT	
<1	SEIFEN 25	DPWA	Multichannel	

### **$N(1520)$ PHOTON DECAY AMPLITUDES AT THE POLE**

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

MODULUS ( $\text{GeV}^{-1/2}$ )	PHASE ( $^\circ$ )	DOCUMENT ID	TECN	COMMENT
$-0.028 \pm 0.005$	$-17 \pm 8$	SARANTSEV 25	DPWA	Multichannel
$-0.043 \pm 0.013$	$-47 \pm 10$	ROENCHEN 22	DPWA	Multichannel
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$-0.031$	$-17$	ROENCHEN 15A	DPWA	Multichannel
$-0.023 \pm 0.004$	$-6 \pm 5$	SOKHOYAN 15A	DPWA	Multichannel

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

<u>MODULUS (<math>\text{GeV}^{-1/2}</math>)</u>	<u>PHASE (<math>^\circ</math>)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
$0.134 \pm 0.007$	$7 \pm 4$	SARANTSEV	25	DPWA Multichannel
$0.112 \pm 0.032$	$1.8 \pm 19$	ROENCHEN	22	DPWA Multichannel
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●				
0.075	1.7	ROENCHEN	15A	DPWA Multichannel
$0.131 \pm 0.006$	$4 \pm 4$	SOKHOYAN	15A	DPWA Multichannel

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

<u>MODULUS (<math>\text{GeV}^{-1/2}</math>)</u>	<u>PHASE (<math>^\circ</math>)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
$-0.045 \pm 0.005$	$-5 \pm 4$	ANISOVICH	17E	DPWA Multichannel

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

<u>MODULUS (<math>\text{GeV}^{-1/2}</math>)</u>	<u>PHASE (<math>^\circ</math>)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
$-0.119 \pm 0.005$	$5 \pm 4$	ANISOVICH	17E	DPWA Multichannel

 **$N(1520)$  BREIT-WIGNER PHOTON DECAY AMPLITUDES** **$N(1520) \rightarrow p\gamma$ , helicity-1/2 amplitude  $A_{1/2}$** 

<u>VALUE (<math>\text{GeV}^{-1/2}</math>)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>-0.030</math> to <math>-0.015</math> (<math>\approx -0.025</math>) OUR ESTIMATE</b>			
$-0.029 \pm 0.004$	SARANTSEV	25	DPWA Multichannel
$-0.034 \pm 0.003$	<sup>1</sup> HUNT	19	DPWA Multichannel
$-0.015 \pm 0.001$	<sup>1</sup> SHKLYAR	13	DPWA Multichannel
$-0.019 \pm 0.002$	<sup>1</sup> WORKMAN	12A	DPWA $\gamma N \rightarrow N\pi$
$-0.028 \pm 0.002$	<sup>1</sup> DUGGER	07	DPWA $\gamma N \rightarrow \pi N$
$-0.038 \pm 0.003$	<sup>1</sup> AHRENS	02	DPWA $\gamma N \rightarrow \pi N$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●			
$-0.024 \pm 0.004$	SOKHOYAN	15A	DPWA Multichannel
$-0.034 \pm 0.001$	<sup>1</sup> SHRESTHA	12A	DPWA Multichannel
$-0.027$	DRECHSEL	07	DPWA $\gamma N \rightarrow \pi N$
$-0.003$	PENNER	02D	DPWA Multichannel
$-0.052 \pm 0.010 \pm 0.007$	<sup>1</sup> MUKHOPAD...	98	$\gamma p \rightarrow \eta p$

<sup>1</sup>Statistical error only. **$N(1520) \rightarrow p\gamma$ , helicity-3/2 amplitude  $A_{3/2}$** 

<u>VALUE (<math>\text{GeV}^{-1/2}</math>)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>0.135 to 0.145 (<math>\approx 0.140</math>) OUR ESTIMATE</b>			
$0.133 \pm 0.006$	SARANTSEV	25	DPWA Multichannel
$0.142 \pm 0.003$	<sup>1</sup> HUNT	19	DPWA Multichannel
$0.146 \pm 0.001$	<sup>1</sup> SHKLYAR	13	DPWA Multichannel
$0.141 \pm 0.002$	<sup>1</sup> WORKMAN	12A	DPWA $\gamma N \rightarrow N\pi$
$0.143 \pm 0.002$	<sup>1</sup> DUGGER	07	DPWA $\gamma N \rightarrow \pi N$
$0.147 \pm 0.010$	<sup>1</sup> AHRENS	02	DPWA $\gamma N \rightarrow \pi N$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●			
$0.130 \pm 0.006$	SOKHOYAN	15A	DPWA Multichannel
$0.127 \pm 0.003$	<sup>1</sup> SHRESTHA	12A	DPWA Multichannel
0.161	DRECHSEL	07	DPWA $\gamma N \rightarrow \pi N$

0.151 PENNER 02D DPWA Multichannel  
 0.130±0.020±0.015 <sup>1</sup> MUKHOPAD... 98  $\gamma p \rightarrow \eta p$   
<sup>1</sup>Statistical error only.

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

VALUE (GeV <sup>-1/2</sup> )	DOCUMENT ID	TECN	COMMENT
<b>−0.055 to −0.040 (≈ −0.050) OUR ESTIMATE</b>			
−0.072±0.003	<sup>1</sup> HUNT	19	DPWA Multichannel
−0.046±0.005	ANISOVICH	17E	DPWA Multichannel
−0.046±0.006	<sup>1</sup> CHEN	12A	DPWA $\gamma N \rightarrow \pi N$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●			
−0.049±0.008	ANISOVICH	13B	DPWA Multichannel
−0.038±0.003	<sup>1</sup> SHRESTHA	12A	DPWA Multichannel
−0.077	DRECHSEL	07	DPWA $\gamma N \rightarrow \pi N$
−0.084	PENNER	02D	DPWA Multichannel

<sup>1</sup>Statistical error only.

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

VALUE (GeV <sup>-1/2</sup> )	DOCUMENT ID	TECN	COMMENT
<b>−0.120 to −0.100 (≈ −0.115) OUR ESTIMATE</b>			
−0.123±0.006	<sup>1</sup> HUNT	19	DPWA Multichannel
−0.118±0.005	ANISOVICH	17E	DPWA Multichannel
−0.115±0.005	<sup>1</sup> CHEN	12A	DPWA $\gamma N \rightarrow \pi N$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●			
−0.113±0.012	ANISOVICH	13B	DPWA Multichannel
−0.101±0.004	<sup>1</sup> SHRESTHA	12A	DPWA Multichannel
−0.154	DRECHSEL	07	DPWA $\gamma N \rightarrow \pi N$
−0.159	PENNER	02D	DPWA Multichannel

<sup>1</sup>Statistical error only.

## $N(1520)$ REFERENCES

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

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ROENCHEN	22	EPJ A58 229	D. Roenchen <i>et al.</i>	(JULI, GWU, BONN+)
ADAMCZEW...	20	PR C102 024001	J. Adamczewski-Musch <i>et al.</i>	(HADES Collab.)
MUELLER	20	PL B803 135323	J. Mueller <i>et al.</i>	(CBELSA/TAPS Collab.)
HUNT	19	PR C99 055205	B.C. Hunt, D.M. Manley	
ANISOVICH	17E	PR C96 055202	A.V. Anisovich <i>et al.</i>	(BONN, PNPI, JLAB+)
ROENCHEN	15A	EPJ A51 70	D. Roenchen <i>et al.</i>	
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THOMA	08	PL B659 87	U. Thoma <i>et al.</i>	(CB-ELSA Collab.)
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DUGGER	07	PR C76 025211	M. Dugger <i>et al.</i>	(JLab CLAS Collab.)
ARNDT	06	PR C74 045205	R.A. Arndt <i>et al.</i>	(GWU)
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AHRENS	02	PRL 88 232002	J. Ahrens <i>et al.</i>	(Mainz MAMI GDH/A2 Collab.)
PENNER	02C	PR C66 055211	G. Penner, U. Mosel	(GIES)
PENNER	02D	PR C66 055212	G. Penner, U. Mosel	(GIES)
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