

$N(2100) 1/2^+$ $I(J^P) = \frac{1}{2}(\frac{1}{2}^+)$ Status: *** **$N(2100)$ POLE POSITION****REAL PART**

VALUE (MeV)	DOCUMENT ID	TECN	COMMENT
2050 to 2150 (≈ 2100) OUR ESTIMATE			
2120 \pm 25	SOKHOYAN	15A	DPWA Multichannel
2052 $\pm 6\pm 3$	¹ SVARC	14	L+P $\pi N \rightarrow \pi N$
2120 \pm 40	CUTKOSKY	80	IPWA $\pi N \rightarrow \pi N$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●			
2217	HUNT	19	DPWA Multichannel
2120 \pm 47	BATINIC	10	DPWA $\pi N \rightarrow N\pi, N\eta$
1810	VRANA	00	DPWA Multichannel

¹Fit to the amplitudes of HOEHLER 79.**−2×IMAGINARY PART**

VALUE (MeV)	DOCUMENT ID	TECN	COMMENT
240 to 340 (≈ 300) OUR ESTIMATE			
290 \pm 30	SOKHOYAN	15A	DPWA Multichannel
337 $\pm 10\pm 4$	¹ SVARC	14	L+P $\pi N \rightarrow \pi N$
240 \pm 80	CUTKOSKY	80	IPWA $\pi N \rightarrow \pi N$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●			
545	HUNT	19	DPWA Multichannel
346 \pm 80	BATINIC	10	DPWA $\pi N \rightarrow N\pi, N\eta$
622	VRANA	00	DPWA Multichannel

¹Fit to the amplitudes of HOEHLER 79. **$N(2100)$ ELASTIC POLE RESIDUE****MODULUS $|r|$**

VALUE (MeV)	DOCUMENT ID	TECN	COMMENT
15 to 30 (≈ 20) OUR ESTIMATE			
23 \pm 5	SOKHOYAN	15A	DPWA Multichannel
30 $\pm 1\pm 1$	¹ SVARC	14	L+P $\pi N \rightarrow \pi N$
14 \pm 7	CUTKOSKY	80	IPWA $\pi N \rightarrow \pi N$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●			
33	BATINIC	10	DPWA $\pi N \rightarrow N\pi, N\eta$

¹Fit to the amplitudes of HOEHLER 79.**PHASE θ**

VALUE ($^\circ$)	DOCUMENT ID	TECN	COMMENT
−100 to −60 (≈ -80) OUR ESTIMATE			
−70 \pm 25	SOKHOYAN	15A	DPWA Multichannel
−92 $\pm 3\pm 2$	¹ SVARC	14	L+P $\pi N \rightarrow \pi N$
35 \pm 25	CUTKOSKY	80	IPWA $\pi N \rightarrow \pi N$

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

– 59 BATINIC 10 DPWA $\pi N \rightarrow N\pi, N\eta$

¹ Fit to the amplitudes of HOEHLER 79.

***N*(2100) INELASTIC POLE RESIDUE**

Normalized residue in $N\pi \rightarrow N(2100) \rightarrow \Delta(1232)\pi$

<u>MODULUS</u>	<u>PHASE (°)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
0.11±0.05	20 ± 60	SOKHOYAN	15A DPWA	Multichannel

Normalized residue in $N\pi \rightarrow N(2100) \rightarrow N\sigma$

<u>MODULUS</u>	<u>PHASE (°)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
0.18±0.06	125 ± 25	SOKHOYAN	15A DPWA	Multichannel

Normalized residue in $N\pi \rightarrow N(2100) \rightarrow N(1535)\pi$

<u>MODULUS</u>	<u>PHASE (°)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
0.22±0.06	–40 ± 25	SOKHOYAN	15A DPWA	Multichannel

***N*(2100) BREIT-WIGNER MASS**

<u>VALUE (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
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2050 to 2150 (\approx 2100) OUR ESTIMATE

2221±92	¹ HUNT	19	DPWA Multichannel
2115±20	SOKHOYAN	15A	DPWA Multichannel
2125±75	CUTKOSKY	80	IPWA $\pi N \rightarrow \pi N$
2050±20	HOEHLER	79	IPWA $\pi N \rightarrow \pi N$

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

2157±42	BATINIC	10	DPWA $\pi N \rightarrow N\pi, N\eta$
2068 ± 3^{+15}_{-40}	ABLIKIM	06K	BES2 $J/\psi \rightarrow (p\pi^-)\bar{n}$
2084±93	VRANA	00	DPWA Multichannel

¹ Statistical error only.

***N*(2100) BREIT-WIGNER WIDTH**

<u>VALUE (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
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200 to 320 (\approx 260) OUR ESTIMATE

545±170	¹ HUNT	19	DPWA Multichannel
290±20	SOKHOYAN	15A	DPWA Multichannel
260±100	CUTKOSKY	80	IPWA $\pi N \rightarrow \pi N$
200±30	HOEHLER	79	IPWA $\pi N \rightarrow \pi N$

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

355±88	BATINIC	10	DPWA $\pi N \rightarrow N\pi, N\eta$
165±14±40	ABLIKIM	06K	BES2 $J/\psi \rightarrow (p\pi^-)\bar{n}$
1077±643	VRANA	00	DPWA Multichannel

¹ Statistical error only.

$N(2100)$ DECAY MODES

Mode	Fraction (Γ_i/Γ)
Γ_1 $N\pi$	8–32 %
Γ_2 $N\eta$	5–45 %
Γ_3 $N\eta'$	5–11 %
Γ_4 $N\omega$	10–25 %
Γ_5 ΛK	<1.0 %
Γ_6 $N\pi\pi$	>55 %
Γ_7 $\Delta(1232)\pi$, P -wave	6–14 %
Γ_8 $N\rho$, $S=1/2$, P -wave	35–70
Γ_9 $N\sigma$	14–35 %
Γ_{10} $N(1535)\pi$	26–34 %
Γ_{11} $\Lambda K^*(892)$	3–11 %
Γ_{12} $p\gamma$, helicity=1/2	0.001–0.13 %
Γ_{13} $n\gamma$, helicity=1/2	0.004–0.09 %

 $N(2100)$ BRANCHING RATIOS **$\Gamma(N\pi)/\Gamma_{\text{total}}$ Γ_1/Γ**

VALUE (%)	DOCUMENT ID	TECN	COMMENT
8–32 % OUR ESTIMATE			
21 ± 11	¹ HUNT	19	DPWA Multichannel
16 ± 5	SOKHOYAN	15A	DPWA Multichannel
12 ± 3	CUTKOSKY	80	IPWA $\pi N \rightarrow \pi N$
10 ± 4	HOEHLER	79	IPWA $\pi N \rightarrow \pi N$
• • • We do not use the following data for averages, fits, limits, etc. • • •			
16 ± 5	BATINIC	10	DPWA $\pi N \rightarrow N\pi, N\eta$
2 ± 5	VRANA	00	DPWA Multichannel

¹Statistical error only. **$\Gamma(N\eta)/\Gamma_{\text{total}}$ Γ_2/Γ**

VALUE (%)	DOCUMENT ID	TECN	COMMENT
5–45 % OUR ESTIMATE			
30 ± 15	MUELLER	20	DPWA Multichannel
< 4.7	¹ HUNT	19	DPWA Multichannel
• • • We do not use the following data for averages, fits, limits, etc. • • •			
83 ± 5	BATINIC	10	DPWA $\pi N \rightarrow N\pi, N\eta$
61 ± 61	VRANA	00	DPWA Multichannel

¹Statistical error only. **$\Gamma(N\eta')/\Gamma_{\text{total}}$ Γ_3/Γ**

VALUE (%)	DOCUMENT ID	TECN	COMMENT
5–11 % OUR ESTIMATE			
8 ± 3	ANISOVICH	17C	DPWA Multichannel

$\Gamma(N\omega)/\Gamma_{\text{total}}$				Γ_4/Γ
<u>VALUE (%)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>	
10–25 % OUR ESTIMATE				
15 ± 10	DENISENKO	16	DPWA	Multichannel
$\Gamma(\Lambda K)/\Gamma_{\text{total}}$				Γ_5/Γ
<u>VALUE (%)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>	
<1.0 % OUR ESTIMATE				
< 1.0	¹ HUNT	19	DPWA	Multichannel
• • • We do not use the following data for averages, fits, limits, etc. • • •				
21 ± 20	VRANA	00	DPWA	Multichannel
¹ Statistical error only.				
$\Gamma(\Delta(1232)\pi, P\text{-wave})/\Gamma_{\text{total}}$				Γ_7/Γ
<u>VALUE (%)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>	
6–14 % OUR ESTIMATE				
< 7.5	¹ HUNT	19	DPWA	Multichannel
10 ± 4	SOKHOYAN	15A	DPWA	Multichannel
• • • We do not use the following data for averages, fits, limits, etc. • • •				
2 ± 1	VRANA	00	DPWA	Multichannel
¹ Statistical error only.				
$\Gamma(N\rho, S=1/2, P\text{-wave})/\Gamma_{\text{total}}$				Γ_8/Γ
<u>VALUE (%)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>	
35–70 OUR ESTIMATE				
52 ± 19	¹ HUNT	19	DPWA	Multichannel
• • • We do not use the following data for averages, fits, limits, etc. • • •				
4 ± 1	VRANA	00	DPWA	Multichannel
¹ Statistical error only.				
$\Gamma(\Lambda K^*(892))/\Gamma_{\text{total}}$				Γ_{11}/Γ
<u>VALUE (%)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>	
3–11 % OUR ESTIMATE				
7 ± 4	ANISOVICH	17B	DPWA	Multichannel
$\Gamma(N\sigma)/\Gamma_{\text{total}}$				Γ_9/Γ
<u>VALUE (%)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>	
14–35 % OUR ESTIMATE				
< 35	¹ HUNT	19	DPWA	Multichannel
20 ± 6	SOKHOYAN	15A	DPWA	Multichannel
• • • We do not use the following data for averages, fits, limits, etc. • • •				
10 ± 1	VRANA	00	DPWA	Multichannel
¹ Statistical error only.				
$\Gamma(N(1535)\pi)/\Gamma_{\text{total}}$				Γ_{10}/Γ
<u>VALUE (%)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>	
26–34 % OUR ESTIMATE				
30 ± 4	SOKHOYAN	15A	DPWA	Multichannel

$N(2100)$ PHOTON DECAY AMPLITUDES AT THE POLE **$N(2100) \rightarrow p\gamma$, helicity-1/2 amplitude $A_{1/2}$**

<u>MODULUS ($\text{GeV}^{-1/2}$)</u>	<u>PHASE ($^\circ$)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
0.011 ± 0.004	65 ± 30	SOKHOYAN	15A	DPWA Multichannel

 $N(2100)$ BREIT-WIGNER PHOTON DECAY AMPLITUDES **$N(2100) \rightarrow p\gamma$, helicity-1/2 amplitude $A_{1/2}$**

<u>VALUE ($\text{GeV}^{-1/2}$)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
0.032 ± 0.014	¹ HUNT	19	DPWA Multichannel
0.010 ± 0.004	SOKHOYAN	15A	DPWA Multichannel

¹ Statistical error only. **$N(2100) \rightarrow n\gamma$, helicity-1/2 amplitude $A_{1/2}$**

<u>VALUE ($\text{GeV}^{-1/2}$)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
0.026 ± 0.013	¹ HUNT	19	DPWA Multichannel

¹ Statistical error only. **$N(2100)$ REFERENCES**

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	17B	PL B771 142	A.V. Anisovich <i>et al.</i>	
ANISOVICH	17C	PL B772 247	A.V. Anisovich <i>et al.</i>	
DENISENKO	16	PL B755 97	I. Denisenko <i>et al.</i>	
SOKHOYAN	15A	EPJ A51 95	V. Sokhoyan <i>et al.</i>	(CBELSA/TAPS Collab.)
SVARC	14	PR C89 045205	A. Svarc <i>et al.</i>	(RBI Zagreb, UNI Tuzla)
BATINIC	10	PR C82 038203	M. Batinic <i>et al.</i>	(ZAGR)
ABLIKIM	06K	PRL 97 062001	M. Ablikim <i>et al.</i>	(BES II Collab.)
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 <i>et al.</i>	(CMU, LBL) IJP
Also		PR D20 2839	R.E. Cutkosky <i>et al.</i>	(CMU, LBL)
HOEHLER	79	PDAT 12-1	G. Hohler <i>et al.</i>	(KARLT) IJP
Also		Toronto Conf. 3	R. Koch	(KARLT) IJP