

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

VALUE (MeV)	DOCUMENT ID	TECN	COMMENT
2050 to 2150 (\approx 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 (\approx 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 (\approx 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 (°)	DOCUMENT ID	TECN	COMMENT
–100 to –60 (\approx –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 $\pi N \rightarrow N\pi, N\eta$

¹Fit 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 ($^\circ$)</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 ($^\circ$)</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 ($^\circ$)</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>
2050 to 2150 (≈ 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 $\pi N \rightarrow N\pi, N\eta$
$2068 \pm 3^{+15}_{-40}$	ABLIKIM	06K	BES2 $J/\psi \rightarrow (p\pi^-)\bar{p}$
2084 ± 93	VRANA	00	DPWA Multichannel

¹Statistical error only. **$N(2100)$ BREIT-WIGNER WIDTH**

<u>VALUE (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
200 to 320 (≈ 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 $\pi N \rightarrow N\pi, N\eta$
$165 \pm 14 \pm 40$	ABLIKIM	06K	BES2 $J/\psi \rightarrow (p\pi^-)\bar{p}$
1077 ± 643	VRANA	00	DPWA Multichannel

¹Statistical error only.

$N(2100)$ DECAY MODES

Mode	Fraction (Γ_i/Γ)
Γ_1 $N\pi$	8–18 %
Γ_2 $N\eta$	seen
Γ_3 $N\eta'$	5–11 %
Γ_4 $N\omega$	10–25 %
Γ_5 ΛK	seen
Γ_6 $N\pi\pi$	20–40 %
Γ_7 $\Delta(1232)\pi$	
Γ_8 $\Delta(1232)\pi$, P -wave	6–14 %
Γ_9 $N\rho$	
Γ_{10} $N\rho$, $S=1/2$, P -wave	seen
Γ_{11} $\Lambda K^*(892)$	3–11 %
Γ_{12} $N\sigma$	14–26 %
Γ_{13} $N(1535)\pi$	26–34 %
Γ_{14} $N\gamma$, helicity=1/2	0.001–0.012 %

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

VALUE (%)	DOCUMENT ID	TECN	COMMENT
8 to 18 (≈ 12) 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
< 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
0.08 ± 0.03	ANISOVICH	17C	DPWA Multichannel

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

VALUE (%)	DOCUMENT ID	TECN	COMMENT
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	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_8/Γ

<u>VALUE (%)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
< 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_{10}/Γ

<u>VALUE (%)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
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>
0.07 ± 0.04	ANISOVICH	17B	DPWA Multichannel

 $\Gamma(N\sigma)/\Gamma_{\text{total}}$ Γ_{12}/Γ

<u>VALUE (%)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
< 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_{13}/Γ

<u>VALUE (%)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
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 (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 (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**

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