$N(2100)\ 1/2^+$

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

N(2100) POLE POSITION

REAL PART

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

[1] Fit to the amplitudes of HOEHLER 79.

−2×IMAGINARY PART

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

[1] Fit 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±5	SOKHOYAN	15A	DPWA	Multichannel
30±1±1	[1] SVARC	14	L+P	$\pi N \to \pi N$
14±7	CUTKOSKY	80	IPWA	$\pi N \to \pi N$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
33	BATINIC	10	DPWA	$\pi N \to N\pi,\ N\eta$

[1] Fit to the amplitudes of HOEHLER 79.

PHASE θ

VALUE (°)	*DOCUMENT ID*		*TECN*	*COMMENT*
−100 to −60 (≈ −80) OUR ESTIMATE				
− 70±25	SOKHOYAN	15A	DPWA	Multichannel
− 92± 3±2	[1] SVARC	14	L+P	$\pi N \to \pi N$
35±25	CUTKOSKY	80	IPWA	$\pi N \to \pi N$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
− 59	BATINIC	10	DPWA	$\pi N \to N\pi,\ N\eta$

[1] Fit to the amplitudes of HOEHLER 79.

N(2100) INELASTIC POLE RESIDUE

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

MODULUS	*PHASE (°)*	*DOCUMENT ID*		*TECN*	*COMMENT*
0.11±0.05	20 ± 60	SOKHOYAN	15A	DPWA	Multichannel

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

MODULUS	*PHASE (°)*	*DOCUMENT ID*		*TECN*	*COMMENT*
0.18±0.06	125 ± 25	SOKHOYAN	15A	DPWA	Multichannel

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

MODULUS	*PHASE (°)*	*DOCUMENT ID*		*TECN*	*COMMENT*
0.22±0.06	−40 ± 25	SOKHOYAN	15A	DPWA	Multichannel

N(2100) BREIT-WIGNER MASS

VALUE (MeV)	*DOCUMENT ID*		*TECN*	*COMMENT*
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	$J/\psi \rightarrow (p\pi^-)\overline{n}$
2084±93	VRANA	00	DPWA	Multichannel

[1] Statistical error only.

N(2100) BREIT-WIGNER WIDTH

VALUE (MeV)	*DOCUMENT ID*		*TECN*	*COMMENT*
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± 14±40	ABLIKIM	06K	BES2	$J/\psi \rightarrow (p\pi^-)\overline{n}$
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

$\Gamma(N\pi)/\Gamma_{total}$ 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	$\pi N \to \pi N$
10± 4	HOEHLER	79	IPWA	$\pi N \to \pi N$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
16± 5	BATINIC	10	DPWA	$\pi N \to N\pi, N\eta$
2± 5	VRANA	00	DPWA	Multichannel

[1] Statistical error only.

$\Gamma(N\eta)/\Gamma_{total}$ 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	$\pi N \to N\pi, N\eta$
61 ±61	VRANA	00	DPWA	Multichannel

[1] Statistical error only.

$\Gamma(N\eta')/\Gamma_{total}$ Γ_3/Γ

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

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

VALUE (%)	DOCUMENT ID		TECN	COMMENT
10–25 % OUR ESTIMATE				
15±10	DENISENKO	16	DPWA	Multichannel

$\Gamma(\Lambda K)/\Gamma_{total}$ Γ_5/Γ

VALUE (%)	DOCUMENT ID		TECN	COMMENT
<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-wave$)/\Gamma_{total}$ Γ_7/Γ

VALUE (%)	DOCUMENT ID		TECN	COMMENT
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-wave$)/\Gamma_{total}$ Γ_8/Γ

VALUE (%)	DOCUMENT ID		TECN	COMMENT
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.

$\Gamma(\Lambda K^*(892))/\Gamma_{total}$ Γ_{11}/Γ

VALUE (%)	DOCUMENT ID		TECN	COMMENT
3–11 % OUR ESTIMATE				
7±4	ANISOVICH	17B	DPWA	Multichannel

$\Gamma(N\sigma)/\Gamma_{total}$ Γ_9/Γ

VALUE (%)	DOCUMENT ID		TECN	COMMENT
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.

$\Gamma(N(1535)\pi)/\Gamma_{total}$ Γ_{10}/Γ

VALUE (%)	DOCUMENT ID		TECN	COMMENT
26–34 % OUR ESTIMATE				
30±4	SOKHOYAN	15A	DPWA	Multichannel

N(2100) PHOTON DECAY AMPLITUDES AT THE POLE

N(2100) → *pγ*, helicity-1/2 amplitude $A_{1/2}$

MODULUS ($GeV^{-1/2}$)	*PHASE* (°)	*DOCUMENT ID*		*TECN*	*COMMENT*
0.011±0.004	65 ± 30	SOKHOYAN	15A	DPWA	Multichannel

N(2100) → *nγ*, helicity-1/2 amplitude $A_{1/2}$

MODULUS	*PHASE* (°)	*DOCUMENT ID*		*TECN*	*COMMENT*
0.029±0.009	35 ± 20	ANISOVICH	17E	DPWA	Multichannel

N(2100) BREIT-WIGNER PHOTON DECAY AMPLITUDES

N(2100) → *pγ*, helicity-1/2 amplitude $A_{1/2}$

VALUE ($GeV^{-1/2}$)	*DOCUMENT ID*		*TECN*	*COMMENT*
0.032±0.014	[1] HUNT	19	DPWA	Multichannel
0.010±0.004	SOKHOYAN	15A	DPWA	Multichannel

[1] Statistical error only.

N(2100) → *nγ*, helicity-1/2 amplitude $A_{1/2}$

VALUE ($GeV^{-1/2}$)	*DOCUMENT ID*		*TECN*	*COMMENT*
0.026±0.013	[1] HUNT	19	DPWA	Multichannel
0.029±0.010	ANISOVICH	17E	DPWA	Multichannel

[1] Statistical error only.

N(2100) REFERENCES

MUELLER	20	PL B803 135323	J. Mueller *et al.*	(CBELSA/TAPS Collab.)
HUNT	19	PR C99 055205	B.C. Hunt, D.M. Manley	
ANISOVICH	17B	PL B771 142	A.V. Anisovich *et al.*	
ANISOVICH	17C	PL B772 247	A.V. Anisovich *et al.*	
ANISOVICH	17E	PR C96 055202	A.V. Anisovich *et al.*	(BONN, PNPI, JLAB+)
DENISENKO	16	PL B755 97	I. Denisenko *et al.*	
SOKHOYAN	15A	EPJ A51 95	V. Sokhoyan *et al.*	(CBELSA/TAPS Collab.)
SVARC	14	PR C89 045205	A. Svarc *et al.*	(RBI Zagreb, UNI Tuzla)
BATINIC	10	PR C82 038203	M. Batinic *et al.*	(ZAGR)
ABLIKIM	06K	PRL 97 062001	M. Ablikim *et al.*	(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 *et al.*	(CMU, LBL) IJP
Also		PR D20 2839	R.E. Cutkosky *et al.*	(CMU, LBL)
HOEHLER	79	PDAT 12-1	G. Hohler *et al.*	(KARLT) IJP
Also		Toronto Conf. 3	R. Koch	(KARLT) IJP