$N(1990)\ 7/2^+$

$I(J^P) = \frac{1}{2}(\frac{7}{2}^+)$ Status: ∗∗

OMITTED FROM SUMMARY TABLE

> Older and obsolete values are listed and referenced in the 2014 edition, Chinese Physics **C38** 070001 (2014).

$N(1990)$ POLE POSITION

REAL PART

VALUE (MeV)	DOCUMENT ID		TECN	COMMENT
2030±65	ANISOVICH	12A	DPWA	Multichannel
1900±30	CUTKOSKY	80	IPWA	$\pi N \to \pi N$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
1941	SHRESTHA	12A	DPWA	Multichannel
2301	VRANA	00	DPWA	Multichannel

$-2\times$IMAGINARY PART

VALUE (MeV)	DOCUMENT ID		TECN	COMMENT
240±60	ANISOVICH	12A	DPWA	Multichannel
260±60	CUTKOSKY	80	IPWA	$\pi N \to \pi N$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
130	SHRESTHA	12A	DPWA	Multichannel
202	VRANA	00	DPWA	Multichannel

$N(1990)$ ELASTIC POLE RESIDUE

MODULUS $|r|$

VALUE (MeV)	DOCUMENT ID		TECN	COMMENT
2±1	ANISOVICH	12A	DPWA	Multichannel
9±3	CUTKOSKY	80	IPWA	$\pi N \to \pi N$

PHASE θ

VALUE (°)	DOCUMENT ID		TECN	COMMENT
125±65	ANISOVICH	12A	DPWA	Multichannel
− 60±30	CUTKOSKY	80	IPWA	$\pi N \to \pi N$

$N(1990)$ BREIT-WIGNER MASS

VALUE (MeV)	DOCUMENT ID		TECN	COMMENT
1950 to 2100 (≈ 2000) OUR ESTIMATE				
2060± 65	ANISOVICH	12A	DPWA	Multichannel
1970± 50	CUTKOSKY	80	IPWA	$\pi N \to \pi N$
2005±150	HOEHLER	79	IPWA	$\pi N \to \pi N$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
1990± 45	SHRESTHA	12A	DPWA	Multichannel
2311± 16	VRANA	00	DPWA	Multichannel

N(1990) BREIT-WIGNER WIDTH

VALUE (MeV)	DOCUMENT ID		TECN	COMMENT
200 to 400 (≈ 300) OUR ESTIMATE				
240± 50	ANISOVICH	12A	DPWA	Multichannel
350±120	CUTKOSKY	80	IPWA	$\pi N \to \pi N$
350±100	HOEHLER	79	IPWA	$\pi N \to \pi N$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
203±161	SHRESTHA	12A	DPWA	Multichannel
205± 72	VRANA	00	DPWA	Multichannel

N(1990) DECAY MODES

	Mode	Fraction (Γ_i/Γ)
Γ_1	$N\pi$	2–6 %
Γ_2	$p\gamma$	0.01–0.12 %
Γ_3	$p\gamma$, helicity=1/2	0.003–0.042 %
Γ_4	$p\gamma$, helicity=3/2	0.009–0.075 %
Γ_5	$n\gamma$	0.01–0.16 %
Γ_6	$n\gamma$, helicity=1/2	0.003–0.066 %
Γ_7	$n\gamma$, helicity=3/2	0.003–0.098 %

N(1990) BRANCHING RATIOS

$\Gamma(N\pi)/\Gamma_{\text{total}}$ $\hspace{4cm}$ Γ_1/Γ

VALUE (%)	DOCUMENT ID		TECN	COMMENT
2 to 6 (≈ 4) OUR ESTIMATE				
2± 1	ANISOVICH	12A	DPWA	Multichannel
6± 2	CUTKOSKY	80	IPWA	$\pi N \to \pi N$
4± 2	HOEHLER	79	IPWA	$\pi N \to \pi N$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
2± 1	SHRESTHA	12A	DPWA	Multichannel
22±11	VRANA	00	DPWA	Multichannel

N(1990) PHOTON DECAY AMPLITUDES AT THE POLE

N(1990) → $p\gamma$, helicity-1/2 amplitude $A_{1/2}$

MODULUS (GeV$^{-1/2}$)	PHASE (°)	DOCUMENT ID		TECN
$0.010^{+0.011}_{-0.006}$	-103^{+108}_{-155}	ROENCHEN	14	DPWA

N(1990) → $p\gamma$, helicity-3/2 amplitude $A_{3/2}$

MODULUS (GeV$^{-1/2}$)	PHASE (°)	DOCUMENT ID		TECN
$0.053^{+0.023}_{-0.028}$	36^{+17}_{-4}	ROENCHEN	14	DPWA

N(1990) BREIT–WIGNER PHOTON DECAY AMPLITUDES

N(1990) → *p*γ, helicity-1/2 amplitude $A_{1/2}$

VALUE (GeV$^{-1/2}$)	DOCUMENT ID		TECN	COMMENT
0.040±0.012	ANISOVICH	12A	DPWA	Multichannel

N(1990) → *p*γ, helicity-3/2 amplitude $A_{3/2}$

VALUE (GeV$^{-1/2}$)	DOCUMENT ID		TECN	COMMENT
0.057±0.012	ANISOVICH	12A	DPWA	Multichannel

N(1990) → *n*γ, helicity-1/2 amplitude $A_{1/2}$

VALUE (GeV$^{-1/2}$)	DOCUMENT ID		TECN	COMMENT
−0.045±0.020	ANISOVICH	13B	DPWA	Multichannel

N(1990) → *n*γ, helicity-3/2 amplitude $A_{3/2}$

VALUE (GeV$^{-1/2}$)	DOCUMENT ID		TECN	COMMENT
−0.052±0.027	ANISOVICH	13B	DPWA	Multichannel

N(1990) REFERENCES

For early references, see Physics Letters **111B** 1 (1982).

PDG	14	CP C38 070001	K. Olive *et al.*	(PDG Collab.)
ROENCHEN	14	EPJ A50 101	D. Roenchen *et al.*	
Also		EPJ A51 63 (errat.)	D. Roenchen *et al.*	
ANISOVICH	13B	EPJ A49 67	A.V. Anisovich *et al.*	
ANISOVICH	12A	EPJ A48 15	A.V. Anisovich *et al.*	(BONN, PNPI)
SHRESTHA	12A	PR C86 055203	M. Shrestha, D.M. Manley	(KSU)
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) IJP
HOEHLER	79	PDAT 12-1	G. Hohler *et al.*	(KARLT) IJP
Also		Toronto Conf. 3	R. Koch	(KARLT) IJP