$N(1990)\ F_{17}$

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

OMITTED FROM SUMMARY TABLE

Most of the results published before 1975 are now obsolete and have been omitted. They may be found in our 1982 edition, Physics Letters **111B** (1982).

The various analyses do not agree very well with one another.

$N(1990)$ BREIT-WIGNER MASS

VALUE (MeV)	DOCUMENT ID		TECN	COMMENT
≈ 1990 OUR ESTIMATE				
2086 ± 28	MANLEY	92	IPWA	$\pi N \to \pi N$ & $N\pi\pi$
2018	CRAWFORD	80	DPWA	$\gamma N \to \pi N$
1970 ± 50	CUTKOSKY	80	IPWA	$\pi N \to \pi N$
2005 ± 150	HOEHLER	79	IPWA	$\pi N \to \pi N$
1999	BARBOUR	78	DPWA	$\gamma N \to \pi N$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
2311 ± 16	VRANA	00	DPWA	Multichannel

$N(1990)$ BREIT-WIGNER WIDTH

VALUE (MeV)	DOCUMENT ID		TECN	COMMENT
535 ± 120	MANLEY	92	IPWA	$\pi N \to \pi N$ & $N\pi\pi$
295	CRAWFORD	80	DPWA	$\gamma N \to \pi N$
350 ± 120	CUTKOSKY	80	IPWA	$\pi N \to \pi N$
350 ± 100	HOEHLER	79	IPWA	$\pi N \to \pi N$
216	BARBOUR	78	DPWA	$\gamma N \to \pi N$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
205 ± 72	VRANA	00	DPWA	Multichannel

$N(1990)$ POLE POSITION

REAL PART

VALUE (MeV)	DOCUMENT ID		TECN	COMMENT
1900 ± 30	CUTKOSKY	80	IPWA	$\pi N \to \pi N$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
2301	VRANA	00	DPWA	Multichannel
not seen	ARNDT	91	DPWA	$\pi N \to \pi N$ Soln SM90

−2×IMAGINARY PART

VALUE (MeV)	DOCUMENT ID		TECN	COMMENT
260 ± 60	CUTKOSKY	80	IPWA	$\pi N \to \pi N$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
202	VRANA	00	DPWA	Multichannel
not seen	ARNDT	91	DPWA	$\pi N \to \pi N$ Soln SM90

$N(1990)$ ELASTIC POLE RESIDUE

MODULUS $|r|$

VALUE (MeV)	DOCUMENT ID		TECN	COMMENT
9 ± 3	CUTKOSKY	80	IPWA	$\pi N \rightarrow \pi N$

PHASE θ

VALUE (°)	DOCUMENT ID		TECN	COMMENT
-60 ± 30	CUTKOSKY	80	IPWA	$\pi N \rightarrow \pi N$

$N(1990)$ DECAY MODES

	Mode
Γ_1	$N \pi$
Γ_2	$N \eta$
Γ_3	ΛK
Γ_4	ΣK
Γ_5	$N \pi \pi$
Γ_6	$p \gamma$, helicity=1/2
Γ_7	$p \gamma$, helicity=3/2
Γ_8	$n \gamma$, helicity=1/2
Γ_9	$n \gamma$, helicity=3/2

$N(1990)$ BRANCHING RATIOS

$\Gamma(N\pi)/\Gamma_{total}$ — Γ_1/Γ

VALUE	DOCUMENT ID		TECN	COMMENT
0.06 ± 0.02	MANLEY	92	IPWA	$\pi N \rightarrow \pi N$ & $N \pi \pi$
0.06 ± 0.02	CUTKOSKY	80	IPWA	$\pi N \rightarrow \pi N$
0.04 ± 0.02	HOEHLER	79	IPWA	$\pi N \rightarrow \pi N$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.22 ± 0.11	VRANA	00	DPWA	Multichannel

$(\Gamma_i \Gamma_f)^{1/2}/\Gamma_{total}$ in $N\pi \rightarrow N(1990) \rightarrow N\eta$ — $(\Gamma_1 \Gamma_2)^{1/2}/\Gamma$

VALUE	DOCUMENT ID		TECN	COMMENT
-0.043	BAKER	79	DPWA	$\pi^- p \rightarrow n \eta$

$\Gamma(N\eta)/\Gamma_{total}$ — Γ_2/Γ

VALUE	DOCUMENT ID		TECN	COMMENT
0.00 ± 0.01	VRANA	00	DPWA	Multichannel

$(\Gamma_i \Gamma_f)^{1/2}/\Gamma_{total}$ in $N\pi \rightarrow N(1990) \rightarrow \Lambda K$ — $(\Gamma_1 \Gamma_3)^{1/2}/\Gamma$

VALUE	DOCUMENT ID		TECN	COMMENT
$+0.01$	BELL	83	DPWA	$\pi^- p \rightarrow \Lambda K^0$
not seen	SAXON	80	DPWA	$\pi^- p \rightarrow \Lambda K^0$
-0.021 ± 0.033	DEVENISH	74B		Fixed-t dispersion rel.

$(\Gamma_i\Gamma_f)^{1/2}/\Gamma_{total}$ in $N\pi \to N(1990) \to \Sigma K$ $(\Gamma_1\Gamma_4)^{1/2}/\Gamma$

VALUE	DOCUMENT ID		TECN	COMMENT
0.010 to 0.023	[1] DEANS	75	DPWA	$\pi N \to \Sigma K$
0.06	LANGBEIN	73	IPWA	$\pi N \to \Sigma K$ (sol. 1)

$(\Gamma_i\Gamma_f)^{1/2}/\Gamma_{total}$ in $N\pi \to N(1990) \to N\pi\pi$ $(\Gamma_1\Gamma_5)^{1/2}/\Gamma$

VALUE	DOCUMENT ID		TECN	COMMENT
not seen	LONGACRE	75	IPWA	$\pi N \to N\pi\pi$

N(1990) PHOTON DECAY AMPLITUDES

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

VALUE (GeV$^{-1/2}$)	DOCUMENT ID		TECN	COMMENT
0.030±0.029	AWAJI	81	DPWA	$\gamma N \to \pi N$
0.001±0.040	CRAWFORD	80	DPWA	$\gamma N \to \pi N$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.040	BARBOUR	78	DPWA	$\gamma N \to \pi N$

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

VALUE (GeV$^{-1/2}$)	DOCUMENT ID		TECN	COMMENT
0.086±0.060	AWAJI	81	DPWA	$\gamma N \to \pi N$
0.004±0.025	CRAWFORD	80	DPWA	$\gamma N \to \pi N$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
+0.004	BARBOUR	78	DPWA	$\gamma N \to \pi N$

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

VALUE (GeV$^{-1/2}$)	DOCUMENT ID		TECN	COMMENT
−0.001	AWAJI	81	DPWA	$\gamma N \to \pi N$
−0.078±0.030	CRAWFORD	80	DPWA	$\gamma N \to \pi N$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
−0.069	BARBOUR	78	DPWA	$\gamma N \to \pi N$

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

VALUE (GeV$^{-1/2}$)	DOCUMENT ID		TECN	COMMENT
−0.178	AWAJI	81	DPWA	$\gamma N \to \pi N$
−0.116±0.045	CRAWFORD	80	DPWA	$\gamma N \to \pi N$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
−0.072	BARBOUR	78	DPWA	$\gamma N \to \pi N$

N(1990) FOOTNOTES

[1] The range given for DEANS 75 is from the four best solutions.

N(1990) REFERENCES

For early references, see Physics Letters **111B** 70 (1982).

VRANA	00	PRPL 328 181	T.P. Vrana, S.A. Dytman,, T.-S.H. Lee	(PITT+)	
MANLEY	92	PR D45 4002	D.M. Manley, E.M. Saleski	(KENT)	IJP
Also	84	PR D30 904	D.M. Manley *et al.*	(VPI)	
ARNDT	91	PR D43 2131	R.A. Arndt *et al.*	(VPI, TELE)	IJP
BELL	83	NP B222 389	K.W. Bell *et al.*	(RL)	IJP
PDG	82	PL 111B	M. Roos *et al.*	(HELS, CIT, CERN)	
AWAJI	81	Bonn Conf. 352	N. Awaji, R. Kajikawa	(NAGO)	
Also	82	NP B197 365	K. Fujii *et al.*	(NAGO)	
CRAWFORD	80	Toronto Conf. 107	R.L. Crawford	(GLAS)	
CUTKOSKY	80	Toronto Conf. 19	R.E. Cutkosky *et al.*	(CMU, LBL)	IJP
Also	79	PR D20 2839	R.E. Cutkosky *et al.*	(CMU, LBL)	IJP
SAXON	80	NP B162 522	D.H. Saxon *et al.*	(RHEL, BRIS)	IJP
BAKER	79	NP B156 93	R.D. Baker *et al.*	(RHEL)	IJP
HOEHLER	79	PDAT 12-1	G. Hohler *et al.*	(KARLT)	IJP
Also	80	Toronto Conf. 3	R. Koch	(KARLT)	IJP
BARBOUR	78	NP B141 253	I.M. Barbour, R.L. Crawford, N.H. Parsons	(GLAS)	
DEANS	75	NP B96 90	S.R. Deans *et al.*	(SFLA, ALAH)	IJP
LONGACRE	75	PL 55B 415	R.S. Longacre *et al.*	(LBL, SLAC)	IJP
DEVENISH	74B	NP B81 330	R.C.E. Devenish, C.D. Froggatt, B.R. Martin	(DESY+)	
LANGBEIN	73	NP B53 251	W. Langbein, F. Wagner	(MUNI)	IJP