NODE=B071

$N(2190)$ G_{17}

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

NODE=B071

Most of the results published before 1975 were last included in our 1982 edition, Physics Letters **111B** 1 (1982). Some further obsolete results published before 1984 were last included in our 2006 edition, Journal of Physics, G **33** 1 (2006).

N(2190) BREIT-WIGNER MASS

NODE=B071205

NODE=B071M

→ NOT CHECKED ←

VALUE (MeV)	DOCUMENT ID		TECN	COMMENT
2100 to 2200 (≈ 2190) OUR ESTIMATE				
2152.4± 1.4	ARNDT	06	DPWA	$\pi N \rightarrow \pi N, \eta N$
2127 ± 9	MANLEY	92	IPWA	$\pi N \rightarrow \pi N$ & $N \pi \pi$
2200 ±70	CUTKOSKY	80	IPWA	$\pi N \rightarrow \pi N$
2140 ±12	HOEHLER	79	IPWA	$\pi N \rightarrow \pi N$
2140 ±40	HENDRY	78	MPWA	$\pi N \rightarrow \pi N$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
2192.1± 8.7	ARNDT	04	DPWA	$\pi N \rightarrow \pi N, \eta N$
2168 ±18	VRANA	00	DPWA	Multichannel
2131	ARNDT	95	DPWA	$\pi N \rightarrow N \pi$
2198 ±68	BATINIC	95	DPWA	$\pi N \rightarrow N \pi, N \eta$
2180	SAXON	80	DPWA	$\pi^- p \rightarrow \Lambda K^0$

N(2190) BREIT-WIGNER WIDTH

NODE=B071210

NODE=B071W

→ NOT CHECKED ←

VALUE (MeV)	DOCUMENT ID		TECN	COMMENT
300 to 700 (≈ 500) OUR ESTIMATE				
484± 13	ARNDT	06	DPWA	$\pi N \rightarrow \pi N, \eta N$
550± 50	MANLEY	92	IPWA	$\pi N \rightarrow \pi N$ & $N \pi \pi$
500±150	CUTKOSKY	80	IPWA	$\pi N \rightarrow \pi N$
390± 30	HOEHLER	79	IPWA	$\pi N \rightarrow \pi N$
270± 50	HENDRY	78	MPWA	$\pi N \rightarrow \pi N$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
726± 62	ARNDT	04	DPWA	$\pi N \rightarrow \pi N, \eta N$
453±101	VRANA	00	DPWA	Multichannel
476	ARNDT	95	DPWA	$\pi N \rightarrow N \pi$
805±140	BATINIC	95	DPWA	$\pi N \rightarrow N \pi, N \eta$
80	SAXON	80	DPWA	$\pi^- p \rightarrow \Lambda K^0$

N(2190) POLE POSITION

NODE=B071215

REAL PART

NODE=B071RE

NODE=B071RE

→ NOT CHECKED ←

VALUE (MeV)	DOCUMENT ID		TECN	COMMENT
2050 to 2100 (≈ 2075) OUR ESTIMATE				
2070	ARNDT	06	DPWA	$\pi N \rightarrow \pi N, \eta N$
2042	[1] HOEHLER	93	SPED	$\pi N \rightarrow \pi N$
2100±50	CUTKOSKY	80	IPWA	$\pi N \rightarrow \pi N$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
2076	ARNDT	04	DPWA	$\pi N \rightarrow \pi N, \eta N$
2107	VRANA	00	DPWA	Multichannel
2030	ARNDT	95	DPWA	$\pi N \rightarrow N \pi$
2060	ARNDT	91	DPWA	$\pi N \rightarrow \pi N$ Soln SM90

−2×IMAGINARY PART

NODE=B071IM

NODE=B071IM

→ NOT CHECKED ←

VALUE (MeV)	DOCUMENT ID		TECN	COMMENT
400 to 520 (≈ 450) OUR ESTIMATE				
520	ARNDT	06	DPWA	$\pi N \rightarrow \pi N, \eta N$
482	[1] HOEHLER	93	SPED	$\pi N \rightarrow \pi N$
400±160	CUTKOSKY	80	IPWA	$\pi N \rightarrow \pi N$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
502	ARNDT	04	DPWA	$\pi N \rightarrow \pi N, \eta N$
380	VRANA	00	DPWA	Multichannel
460	ARNDT	95	DPWA	$\pi N \rightarrow N \pi$
464	ARNDT	91	DPWA	$\pi N \rightarrow \pi N$ Soln SM90

$N(2190)$ ELASTIC POLE RESIDUE

NODE=B071220

MODULUS $|r|$

NODE=B071RER
NODE=B071RER

VALUE (MeV)	DOCUMENT ID		TECN	COMMENT
72	ARNDT	06	DPWA	$\pi N \rightarrow \pi N, \eta N$
45	HOEHLER	93	SPED	$\pi N \rightarrow \pi N$
25 ± 10	CUTKOSKY	80	IPWA	$\pi N \rightarrow \pi N$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
68	ARNDT	04	DPWA	$\pi N \rightarrow \pi N, \eta N$
46	ARNDT	95	DPWA	$\pi N \rightarrow N\pi$
54	ARNDT	91	DPWA	$\pi N \rightarrow \pi N$ Soln SM90

PHASE θ

NODE=B071IMR
NODE=B071IMR

VALUE (°)	DOCUMENT ID		TECN	COMMENT
-32	ARNDT	06	DPWA	$\pi N \rightarrow \pi N, \eta N$
-30 ± 50	CUTKOSKY	80	IPWA	$\pi N \rightarrow \pi N$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
-32	ARNDT	04	DPWA	$\pi N \rightarrow \pi N, \eta N$
-23	ARNDT	95	DPWA	$\pi N \rightarrow N\pi$
-44	ARNDT	91	DPWA	$\pi N \rightarrow \pi N$ Soln SM90

$N(2190)$ DECAY MODES

NODE=B071225;NODE=B071

The following branching fractions are our estimates, not fits or averages.

NODE=B071

	Mode	Fraction (Γ_i/Γ)	
Γ_1	$N\pi$	10–20 %	DESIG=1;OUR EST
Γ_2	$N\eta$	(0.0 ± 1.0) %	DESIG=2
Γ_3	ΛK		DESIG=3
Γ_4	ΣK		DESIG=4
Γ_5	$N\pi\pi$		DESIG=5
Γ_6	$N\rho$		DESIG=14
Γ_7	$N\rho$, S=3/2, D-wave		DESIG=6
Γ_8	$p\gamma$, helicity=1/2		DESIG=7
Γ_9	$p\gamma$, helicity=3/2		DESIG=8
Γ_{10}	$n\gamma$, helicity=1/2		DESIG=9
Γ_{11}	$n\gamma$, helicity=3/2		DESIG=10

$N(2190)$ BRANCHING RATIOS

NODE=B071230

$\Gamma(N\pi)/\Gamma_{total}$ $\quad\quad$ Γ_1/Γ

NODE=B071R1
NODE=B071R1
→ NOT CHECKED ←

VALUE	DOCUMENT ID		TECN	COMMENT
0.1 to 0.2 OUR ESTIMATE				
0.238 ± 0.001	ARNDT	06	DPWA	$\pi N \rightarrow \pi N, \eta N$
0.22 ± 0.01	MANLEY	92	IPWA	$\pi N \rightarrow \pi N$ & $N\pi\pi$
0.12 ± 0.06	CUTKOSKY	80	IPWA	$\pi N \rightarrow \pi N$
0.14 ± 0.02	HOEHLER	79	IPWA	$\pi N \rightarrow \pi N$
0.16 ± 0.04	HENDRY	78	MPWA	$\pi N \rightarrow \pi N$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.230 ± 0.002	ARNDT	04	DPWA	$\pi N \rightarrow \pi N, \eta N$
0.20 ± 0.04	VRANA	00	DPWA	Multichannel
0.23	ARNDT	95	DPWA	$\pi N \rightarrow N\pi$
0.19 ± 0.05	BATINIC	95	DPWA	$\pi N \rightarrow N\pi, N\eta$

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

NODE=B071R8
NODE=B071R8

VALUE	DOCUMENT ID		TECN	COMMENT
0.00 ± 0.01	VRANA	00	DPWA	Multichannel
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.001 ± 0.003	BATINIC	95	DPWA	$\pi N \rightarrow N\pi, N\eta$

$(\Gamma_i\Gamma_f)^{1/2}/\Gamma_{total}$ in $N\pi \rightarrow N(2190) \rightarrow \Lambda K$ $\quad\quad$ $(\Gamma_1\Gamma_3)^{1/2}/\Gamma$

NODE=B071R3
NODE=B071R3

VALUE	DOCUMENT ID		TECN	COMMENT
-0.02	BELL	83	DPWA	$\pi^- p \rightarrow \Lambda K^0$
-0.02	SAXON	80	DPWA	$\pi^- p \rightarrow \Lambda K^0$

$(\Gamma_i\Gamma_f)^{1/2}/\Gamma_{total}$ in $N\pi \rightarrow N(2190) \rightarrow N\rho$, S=3/2, D-wave $(\Gamma_1\Gamma_7)^{1/2}/\Gamma$

NODE=B071R5
NODE=B071R5

VALUE	DOCUMENT ID		TECN	COMMENT
-0.25 ± 0.03	MANLEY	92	IPWA	$\pi N \rightarrow \pi N$ & $N\pi\pi$

$\Gamma(N\rho, S=3/2, D\text{-wave})/\Gamma_{total}$ Γ_7/Γ

NODE=B071R9
NODE=B071R9

VALUE	DOCUMENT ID		TECN	COMMENT
0.29 ± 0.28	VRANA	00	DPWA	Multichannel

N(2190) PHOTON DECAY AMPLITUDES

NODE=B071235

Papers on γN amplitudes predating 1981 may be found in our 2006 edition, Journal of Physics, G **33** 1 (2006).

NODE=B071235

$N(2190) \rightarrow p\gamma$, helicity-1/2 amplitude $A_{1/2}$

NODE=B071A1

NODE=B071A1

$N(2190) \rightarrow p\gamma$, helicity-3/2 amplitude $A_{3/2}$

NODE=B071A2

NODE=B071A2

$N(2190) \rightarrow n\gamma$, helicity-1/2 amplitude $A_{1/2}$

NODE=B071A3

NODE=B071A3

$N(2190) \rightarrow n\gamma$, helicity-3/2 amplitude $A_{3/2}$

NODE=B071A4

NODE=B071A4

N(2190) $\gamma p \rightarrow \Lambda K^+$ AMPLITUDES

NODE=B071240

$(\Gamma_i\Gamma_f)^{1/2}/\Gamma_{total}$ in $p\gamma \rightarrow N(2190) \rightarrow \Lambda K^+$ (E_{4-} amplitude)

NODE=B071LK1
NODE=B071LK1

VALUE (units 10^{-3})	DOCUMENT ID		TECN
• • • We do not use the following data for averages, fits, limits, etc. • • •			
$2.5\ \pm1.0$	WORKMAN	90	DPWA
2.04	TANABE	89	DPWA

$p\gamma \rightarrow N(2190) \rightarrow \Lambda K^+$ phase angle θ (E_{4-} amplitude)

NODE=B071LP1
NODE=B071LP1

VALUE (degrees)	DOCUMENT ID		TECN
• • • We do not use the following data for averages, fits, limits, etc. • • •			
$-\ 4\ \ \pm9$	WORKMAN	90	DPWA
-27.5	TANABE	89	DPWA

$(\Gamma_i\Gamma_f)^{1/2}/\Gamma_{total}$ in $p\gamma \rightarrow N(2190) \rightarrow \Lambda K^+$ (M_{4-} amplitude)

NODE=B071LK2
NODE=B071LK2

VALUE (units 10^{-3})	DOCUMENT ID		TECN
• • • We do not use the following data for averages, fits, limits, etc. • • •			
$-7.0\ \pm0.7$	WORKMAN	90	DPWA
-5.78	TANABE	89	DPWA

N(2190) FOOTNOTES

NODE=B071

[1] See HOEHLER 93 for a detailed discussion of the evidence for and the pole parameters of N and Δ resonances as determined from Argand diagrams of πN elastic partial-wave amplitudes and from plots of the speeds with which the amplitudes traverse the diagrams.

NODE=B010;LINKAGE=H9

N(2190) REFERENCES

NODE=B071

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

NODE=B071

ARNDT	06	PR C74 045205	R.A. Arndt *et al.*	(GWU)	REFID=51535
PDG	06	JPG 33 1	W.-M. Yao *et al.*	(PDG Collab.)	REFID=51004
ARNDT	04	PR C69 035213	R.A. Arndt *et al.*	(GWU, TRIU)	REFID=49947
VRANA	00	PRPL 328 181	T.P. Vrana, S.A. Dytman,, T.-S.H. Lee	(PITT+)	REFID=47593
ARNDT	95	PR C52 2120	R.A. Arndt *et al.*	(VPI, BRCO)	REFID=44535
BATINIC	95	PR C51 2310	M. Batinic *et al.*	(BOSK, UCLA)	REFID=44253
Also		PR C57 1004 (erratum)	M. Batinic *et al.*		REFID=46020
HOEHLER	93	πN Newsletter 9 1	G. Hohler	(KARL)	REFID=43821
MANLEY	92	PR D45 4002	D.M. Manley, E.M. Saleski	(KENT) IJP	REFID=41535
Also		PR D30 904	D.M. Manley *et al.*	(VPI)	REFID=30071
ARNDT	91	PR D43 2131	R.A. Arndt *et al.*	(VPI, TELE) IJP	REFID=41467

WORKMAN	90	PR C42 781	R.L. Workman	(VPI)	REFID=43685
TANABE	89	PR C39 741	H. Tanabe, M. Kohno, C. Bennhold	(MANZ)	REFID=40997
Also		NC 102A 193	M. Kohno, H. Tanabe, C. Bennhold	(MANZ)	REFID=40998
BELL	83	NP B222 389	K.W. Bell *et al.*	(RL) IJP	REFID=30409
PDG	82	PL 111B 1	M. Roos *et al.*	(HELS, CIT, CERN)	REFID=41167
CUTKOSKY	80	Toronto Conf. 19	R.E. Cutkosky *et al.*	(CMU, LBL) IJP	REFID=30064
Also		PR D20 2839	R.E. Cutkosky *et al.*	(CMU, LBL) IJP	REFID=40096
SAXON	80	NP B162 522	D.H. Saxon *et al.*	(RHEL, BRIS) IJP	REFID=30404
HOEHLER	79	PDAT 12-1	G. Hohler *et al.*	(KARLT) IJP	REFID=30058
Also		Toronto Conf. 3	R. Koch	(KARLT) IJP	REFID=30859
HENDRY	78	PRL 41 222	A.W. Hendry	(IND, LBL) IJP	REFID=30893
Also		ANP 136 1	A.W. Hendry	(IND)	REFID=30901