

$N(2090) S_{11}$

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

OMITTED FROM SUMMARY TABLE

Any structure in the S_{11} wave above 1800 MeV is listed here. A few early results that are now obsolete have been omitted.

The latest GWU analysis (ARNDT 06) finds no evidence for this resonance.

 $N(2090)$ BREIT-WIGNER MASS

<u>VALUE (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
≈ 2090 OUR ESTIMATE			
1928 ± 59	MANLEY	92	IPWA $\pi N \rightarrow \pi N$ & $N\pi\pi$
2180 ± 80	CUTKOSKY	80	IPWA $\pi N \rightarrow \pi N$
1880 ± 20	HOEHLER	79	IPWA $\pi N \rightarrow \pi N$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●			
1822 ± 43	VRANA	00	DPWA Multichannel
$1897 \pm 50^{+30}_{-2}$	PLOETZKE	98	SPEC $\gamma p \rightarrow p\eta'(958)$

 $N(2090)$ BREIT-WIGNER WIDTH

<u>VALUE (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
414 ± 157	MANLEY	92	IPWA $\pi N \rightarrow \pi N$ & $N\pi\pi$
350 ± 100	CUTKOSKY	80	IPWA $\pi N \rightarrow \pi N$
95 ± 30	HOEHLER	79	IPWA $\pi N \rightarrow \pi N$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●			
248 ± 185	VRANA	00	DPWA Multichannel
$396 \pm 155^{+35}_{-45}$	PLOETZKE	98	SPEC $\gamma p \rightarrow p\eta'(958)$

 $N(2090)$ POLE POSITION**REAL PART**

<u>VALUE (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
2150 ± 70	CUTKOSKY	80	IPWA $\pi N \rightarrow \pi N$
1937 or 1949	¹ LONGACRE	78	IPWA $\pi N \rightarrow N\pi\pi$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●			
1795	VRANA	00	DPWA Multichannel

-2×IMAGINARY PART

<u>VALUE (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
350 ± 100	CUTKOSKY	80	IPWA $\pi N \rightarrow \pi N$
139 or 131	¹ LONGACRE	78	IPWA $\pi N \rightarrow N\pi\pi$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●			
220	VRANA	00	DPWA Multichannel

N(2090) ELASTIC POLE RESIDUE

MODULUS $|r|$

<u>VALUE (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
40 ± 20	CUTKOSKY 80	IPWA	$\pi N \rightarrow \pi N$

PHASE θ

<u>VALUE (°)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
0 ± 90	CUTKOSKY 80	IPWA	$\pi N \rightarrow \pi N$

N(2090) DECAY MODES

Mode	
Γ_1	$N\pi$
Γ_2	$N\eta$
Γ_3	ΛK
Γ_4	$N\pi\pi$
Γ_5	$\Delta\pi$
Γ_6	$\Delta(1232)\pi$, <i>D-wave</i>
Γ_7	$N\rho$
Γ_8	$N\rho$, $S=1/2$, <i>S-wave</i>
Γ_9	$N\rho$, $S=3/2$, <i>D-wave</i>
Γ_{10}	$N(\pi\pi)_{S-wave}^{I=0}$
Γ_{11}	$N(1440)\pi$

N(2090) BRANCHING RATIOS

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

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
0.10 ± 0.10	MANLEY 92	IPWA	$\pi N \rightarrow \pi N$ & $N\pi\pi$
0.18 ± 0.08	CUTKOSKY 80	IPWA	$\pi N \rightarrow \pi N$
0.09 ± 0.05	HOEHLER 79	IPWA	$\pi N \rightarrow \pi N$

• • • We do not use the following data for averages, fits, limits, etc. • • •

0.17 ± 0.03	VRANA 00	DPWA	Multichannel
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$\Gamma(N\eta)/\Gamma_{\text{total}}$ Γ_2/Γ

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
0.41 ± 0.04	VRANA 00	DPWA	Multichannel

$(\Gamma_i\Gamma_f)^{1/2}/\Gamma_{\text{total}}$ in $N\pi \rightarrow N(2090) \rightarrow \Lambda K$ $(\Gamma_1\Gamma_3)^{1/2}/\Gamma$

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
not seen	SAXON 80	DPWA	$\pi^- p \rightarrow \Lambda K^0$

$\Gamma(\Delta(1232)\pi, D\text{-wave})/\Gamma_{\text{total}}$ Γ_6/Γ

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
0.01 ± 0.01	VRANA 00	DPWA	Multichannel

$\Gamma(N\rho, S=1/2, S\text{-wave})/\Gamma_{\text{total}}$				Γ_8/Γ
<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>	
0.36±0.01	VRANA 00	DPWA	Multichannel	

$\Gamma(N\rho, S=3/2, D\text{-wave})/\Gamma_{\text{total}}$				Γ_9/Γ
<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>	
0.01±0.01	VRANA 00	DPWA	Multichannel	

$\Gamma(N(\pi\pi)_{S\text{-wave}}^{I=0})/\Gamma_{\text{total}}$				Γ_{10}/Γ
<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>	
0.02±0.01	VRANA 00	DPWA	Multichannel	

$\Gamma(N(1440)\pi)/\Gamma_{\text{total}}$				Γ_{11}/Γ
<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>	
0.02±0.01	VRANA 00	DPWA	Multichannel	

N(2090) FOOTNOTES

¹ LONGACRE 78 values are from a search for poles in the unitarized T-matrix. The first (second) value uses, in addition to $\pi N \rightarrow N\pi\pi$ data, elastic amplitudes from a Saclay (CERN) partial-wave analysis.

N(2090) REFERENCES

ARNDT	06	PR C74 045205	R.A. Arndt <i>et al.</i>	(GWU)
VRANA	00	PRPL 328 181	T.P. Vrana, S.A. Dytman,, T.-S.H. Lee	(PITT+)
PLOETZKE	98	PL B444 555	R. Ploetzke <i>et al.</i>	(Bonn SAPHIR Collab.)
MANLEY	92	PR D45 4002	D.M. Manley, E.M. Saleski	(KENT) IJP
Also		PR D30 904	D.M. Manley <i>et al.</i>	(VPI)
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)
SAXON	80	NP B162 522	D.H. Saxon <i>et al.</i>	(RHEL, BRIS) IJP
HOEHLER	79	PDAT 12-1	G. Hohler <i>et al.</i>	(KARLT) IJP
Also		Toronto Conf. 3	R. Koch	(KARLT) IJP
LONGACRE	78	PR D17 1795	R.S. Longacre <i>et al.</i>	(LBL, SLAC)