

**$N(2090) S_{11}$** 

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

## 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.

 **$N(2090)$  BREIT-WIGNER MASS**

<u>VALUE (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>≈ 2090 OUR ESTIMATE</b>			
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±50 <sup>+30</sup> <sub>-2</sub>	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±155 <sup>+35</sup> <sub>-45</sub>	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	<sup>1</sup> 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	<sup>1</sup> 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 $\theta$

<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	
$\Gamma_1$	$N\pi$
$\Gamma_2$	$N\eta$
$\Gamma_3$	$\Lambda K$
$\Gamma_4$	$N\pi\pi$
$\Gamma_5$	$\Delta\pi$
$\Gamma_6$	$\Delta(1232)\pi, D\text{-wave}$
$\Gamma_7$	$N\rho$
$\Gamma_8$	$N\rho, S=1/2, S\text{-wave}$
$\Gamma_9$	$N\rho, S=3/2, D\text{-wave}$
$\Gamma_{10}$	$N(\pi\pi)_{S\text{-wave}}^{I=0}$
$\Gamma_{11}$	$N(1440)\pi$

## N(2090) BRANCHING RATIOS

$\Gamma(N\pi)/\Gamma_{\text{total}}$	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>	$\Gamma_1/\Gamma$
0.10 ± 0.10	MANLEY	92	IPWA $\pi N \rightarrow \pi N \text{ \& } N\pi\pi$	
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	

$\Gamma(N\eta)/\Gamma_{\text{total}}$	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>	$\Gamma_2/\Gamma$
0.41 ± 0.04	VRANA	00	DPWA Multichannel	

$(\Gamma_i\Gamma_f)^{1/2}/\Gamma_{\text{total}}$ in $N\pi \rightarrow N(2090) \rightarrow \Lambda K$	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>	$(\Gamma_1\Gamma_3)^{1/2}/\Gamma$
not seen	SAXON	80	DPWA $\pi^- p \rightarrow \Lambda K^0$	

$\Gamma(\Delta(1232)\pi, D\text{-wave})/\Gamma_{\text{total}}$	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>	$\Gamma_6/\Gamma$
0.01 ± 0.01	VRANA	00	DPWA Multichannel	

$\Gamma(N\rho, S=1/2, S\text{-wave})/\Gamma_{\text{total}}$				$\Gamma_8/\Gamma$
<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>	
0.36±0.01	VRANA	00	DPWA Multichannel	
$\Gamma(N\rho, S=3/2, D\text{-wave})/\Gamma_{\text{total}}$				$\Gamma_9/\Gamma$
<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>	
0.01±0.01	VRANA	00	DPWA Multichannel	
$\Gamma(N(\pi\pi)_{S\text{-wave}}^{I=0})/\Gamma_{\text{total}}$				$\Gamma_{10}/\Gamma$
<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>	
0.02±0.01	VRANA	00	DPWA Multichannel	
$\Gamma(N(1440)\pi)/\Gamma_{\text{total}}$				$\Gamma_{11}/\Gamma$
<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>	
0.02±0.01	VRANA	00	DPWA Multichannel	

### N(2090) FOOTNOTES

<sup>1</sup> 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

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	84	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	79	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	80	Toronto Conf. 3	R. Koch	(KARLT) IJP
LONGACRE	78	PR D17 1795	R.S. Longacre <i>et al.</i>	(LBL, SLAC)