

$N(2100) \ 1/2^+$  $I(J^P) = \frac{1}{2}(\frac{1}{2}^+)$  Status: \*\*\* **$N(2100)$  POLE POSITION****REAL PART**

VALUE (MeV)	DOCUMENT ID	TECN	COMMENT
<b>2050 to 2150 (<math>\approx 2100</math>) OUR ESTIMATE</b>			
2120 $\pm$ 25	SOKHOYAN	15A	DPWA Multichannel
2052 $\pm$ 6 $\pm$ 3	<sup>1</sup> SVARC	14	L+P $\pi N \rightarrow \pi N$
2120 $\pm$ 40	CUTKOSKY	80	IPWA $\pi N \rightarrow \pi N$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●			
2217	HUNT	19	DPWA Multichannel
2120 $\pm$ 47	BATINIC	10	DPWA $\pi N \rightarrow N\pi, N\eta$
1810	VRANA	00	DPWA Multichannel

<sup>1</sup>Fit to the amplitudes of HOEHLER 79.**–2×IMAGINARY PART**

VALUE (MeV)	DOCUMENT ID	TECN	COMMENT
<b>240 to 340 (<math>\approx 300</math>) OUR ESTIMATE</b>			
290 $\pm$ 30	SOKHOYAN	15A	DPWA Multichannel
337 $\pm$ 10 $\pm$ 4	<sup>1</sup> SVARC	14	L+P $\pi N \rightarrow \pi N$
240 $\pm$ 80	CUTKOSKY	80	IPWA $\pi N \rightarrow \pi N$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●			
545	HUNT	19	DPWA Multichannel
346 $\pm$ 80	BATINIC	10	DPWA $\pi N \rightarrow N\pi, N\eta$
622	VRANA	00	DPWA Multichannel

<sup>1</sup>Fit to the amplitudes of HOEHLER 79. **$N(2100)$  ELASTIC POLE RESIDUE****MODULUS  $|r|$** 

VALUE (MeV)	DOCUMENT ID	TECN	COMMENT
<b>15 to 30 (<math>\approx 20</math>) OUR ESTIMATE</b>			
23 $\pm$ 5	SOKHOYAN	15A	DPWA Multichannel
30 $\pm$ 1 $\pm$ 1	<sup>1</sup> SVARC	14	L+P $\pi N \rightarrow \pi N$
14 $\pm$ 7	CUTKOSKY	80	IPWA $\pi N \rightarrow \pi N$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●			
33	BATINIC	10	DPWA $\pi N \rightarrow N\pi, N\eta$

<sup>1</sup>Fit to the amplitudes of HOEHLER 79.**PHASE  $\theta$** 

VALUE ( $^\circ$ )	DOCUMENT ID	TECN	COMMENT
<b>–100 to –60 (<math>\approx</math> –80) OUR ESTIMATE</b>			
–70 $\pm$ 25	SOKHOYAN	15A	DPWA Multichannel
–92 $\pm$ 3 $\pm$ 2	<sup>1</sup> SVARC	14	L+P $\pi N \rightarrow \pi N$
35 $\pm$ 25	CUTKOSKY	80	IPWA $\pi N \rightarrow \pi N$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●			
–59	BATINIC	10	DPWA $\pi N \rightarrow N\pi, N\eta$

<sup>1</sup> Fit to the amplitudes of HOEHLER 79. **$N(2100)$  INELASTIC POLE RESIDUE****Normalized residue in  $N\pi \rightarrow N(2100) \rightarrow \Delta(1232)\pi$** 

<u>MODULUS</u>	<u>PHASE (<math>^\circ</math>)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
0.11±0.05	20 ± 60	SOKHOYAN	15A DPWA	Multichannel

**Normalized residue in  $N\pi \rightarrow N(2100) \rightarrow N\sigma$** 

<u>MODULUS</u>	<u>PHASE (<math>^\circ</math>)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
0.18±0.06	125 ± 25	SOKHOYAN	15A DPWA	Multichannel

**Normalized residue in  $N\pi \rightarrow N(2100) \rightarrow N(1535)\pi$** 

<u>MODULUS</u>	<u>PHASE (<math>^\circ</math>)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
0.22±0.06	-40 ± 25	SOKHOYAN	15A DPWA	Multichannel

 **$N(2100)$  BREIT-WIGNER MASS**

<u>VALUE (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>2050 to 2150 (<math>\approx</math> 2100) OUR ESTIMATE</b>			
2221±92	<sup>1</sup> HUNT	19	DPWA Multichannel
2115±20	SOKHOYAN	15A	DPWA Multichannel
2125±75	CUTKOSKY	80	IPWA $\pi N \rightarrow \pi N$
2050±20	HOEHLER	79	IPWA $\pi N \rightarrow \pi N$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●			
2157±42	BATINIC	10	DPWA $\pi N \rightarrow N\pi, N\eta$
2068 ± $3^{+15}_{-40}$	ABLIKIM	06K	BES2 $J/\psi \rightarrow (p\pi^-)\bar{p}$
2084±93	VRANA	00	DPWA Multichannel

<sup>1</sup> Statistical error only. **$N(2100)$  BREIT-WIGNER WIDTH**

<u>VALUE (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>200 to 320 (<math>\approx</math> 260) OUR ESTIMATE</b>			
545±170	<sup>1</sup> HUNT	19	DPWA Multichannel
290±20	SOKHOYAN	15A	DPWA Multichannel
260±100	CUTKOSKY	80	IPWA $\pi N \rightarrow \pi N$
200±30	HOEHLER	79	IPWA $\pi N \rightarrow \pi N$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●			
355±88	BATINIC	10	DPWA $\pi N \rightarrow N\pi, N\eta$
165 ± 14±40	ABLIKIM	06K	BES2 $J/\psi \rightarrow (p\pi^-)\bar{p}$
1077±643	VRANA	00	DPWA Multichannel

<sup>1</sup> Statistical error only.

**$N(2100)$  DECAY MODES**

	Mode	Fraction ( $\Gamma_i/\Gamma$ )
$\Gamma_1$	$N\pi$	8–18 %
$\Gamma_2$	$N\eta$	seen
$\Gamma_3$	$N\eta'$	5–11 %
$\Gamma_4$	$N\omega$	10–25 %
$\Gamma_5$	$\Lambda K$	seen
$\Gamma_6$	$N\pi\pi$	20–40 %
$\Gamma_7$	$\Delta(1232)\pi$	
$\Gamma_8$	$\Delta(1232)\pi$ , $P$ -wave	6–14 %
$\Gamma_9$	$N\rho$	
$\Gamma_{10}$	$N\rho$ , $S=1/2$ , $P$ -wave	seen
$\Gamma_{11}$	$\Lambda K^*(892)$	3–11 %
$\Gamma_{12}$	$N\sigma$	14–26 %
$\Gamma_{13}$	$N(1535)\pi$	26–34 %
$\Gamma_{14}$	$N\gamma$ , helicity=1/2	0.001–0.012 %

 **$N(2100)$  BRANCHING RATIOS** **$\Gamma(N\pi)/\Gamma_{\text{total}}$   $\Gamma_1/\Gamma$** 

VALUE (%)	DOCUMENT ID	TECN	COMMENT
<b>8 to 18 (<math>\approx 12</math>) OUR ESTIMATE</b>			
$21 \pm 11$	<sup>1</sup> HUNT	19	DPWA Multichannel
$16 \pm 5$	SOKHOYAN	15A	DPWA Multichannel
$12 \pm 3$	CUTKOSKY	80	IPWA $\pi N \rightarrow \pi N$
$10 \pm 4$	HOEHLER	79	IPWA $\pi N \rightarrow \pi N$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●			
$16 \pm 5$	BATINIC	10	DPWA $\pi N \rightarrow N\pi$ , $N\eta$
$2 \pm 5$	VRANA	00	DPWA Multichannel

<sup>1</sup>Statistical error only. **$\Gamma(N\eta)/\Gamma_{\text{total}}$   $\Gamma_2/\Gamma$** 

VALUE (%)	DOCUMENT ID	TECN	COMMENT
$30 \pm 15$	MUELLER	20	DPWA Multichannel
$< 4.7$	<sup>1</sup> HUNT	19	DPWA Multichannel
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●			
$83 \pm 5$	BATINIC	10	DPWA $\pi N \rightarrow N\pi$ , $N\eta$
$61 \pm 61$	VRANA	00	DPWA Multichannel

<sup>1</sup>Statistical error only. **$\Gamma(N\eta')/\Gamma_{\text{total}}$   $\Gamma_3/\Gamma$** 

VALUE	DOCUMENT ID	TECN	COMMENT
$0.08 \pm 0.03$	ANISOVICH	17C	DPWA Multichannel

$\Gamma(N\omega)/\Gamma_{\text{total}}$					$\Gamma_4/\Gamma$
<u>VALUE (%)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>		
15 ± 10	DENISENKO	16	DPWA	Multichannel	

$\Gamma(\Lambda K)/\Gamma_{\text{total}}$					$\Gamma_5/\Gamma$
<u>VALUE (%)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>		
< 1.0	<sup>1</sup> HUNT	19	DPWA	Multichannel	
• • • We do not use the following data for averages, fits, limits, etc. • • •					
21 ± 20	VRANA	00	DPWA	Multichannel	
<sup>1</sup> Statistical error only.					

$\Gamma(\Delta(1232)\pi, P\text{-wave})/\Gamma_{\text{total}}$					$\Gamma_8/\Gamma$
<u>VALUE (%)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>		
< 7.5	<sup>1</sup> HUNT	19	DPWA	Multichannel	
10 ± 4	SOKHOYAN	15A	DPWA	Multichannel	
• • • We do not use the following data for averages, fits, limits, etc. • • •					
2 ± 1	VRANA	00	DPWA	Multichannel	
<sup>1</sup> Statistical error only.					

$\Gamma(N\rho, S=1/2, P\text{-wave})/\Gamma_{\text{total}}$					$\Gamma_{10}/\Gamma$
<u>VALUE (%)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>		
52 ± 19	<sup>1</sup> HUNT	19	DPWA	Multichannel	
• • • We do not use the following data for averages, fits, limits, etc. • • •					
4 ± 1	VRANA	00	DPWA	Multichannel	
<sup>1</sup> Statistical error only.					

$\Gamma(\Lambda K^*(892))/\Gamma_{\text{total}}$					$\Gamma_{11}/\Gamma$
<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>		
0.07 ± 0.04	ANISOVICH	17B	DPWA	Multichannel	

$\Gamma(N\sigma)/\Gamma_{\text{total}}$					$\Gamma_{12}/\Gamma$
<u>VALUE (%)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>		
< 35	<sup>1</sup> HUNT	19	DPWA	Multichannel	
20 ± 6	SOKHOYAN	15A	DPWA	Multichannel	
• • • We do not use the following data for averages, fits, limits, etc. • • •					
10 ± 1	VRANA	00	DPWA	Multichannel	
<sup>1</sup> Statistical error only.					

$\Gamma(N(1535)\pi)/\Gamma_{\text{total}}$					$\Gamma_{13}/\Gamma$
<u>VALUE (%)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>		
30 ± 4	SOKHOYAN	15A	DPWA	Multichannel	

## N(2100) PHOTON DECAY AMPLITUDES AT THE POLE

### $N(2100) \rightarrow \rho\gamma$ , helicity-1/2 amplitude $A_{1/2}$

<u>MODULUS (<math>\text{GeV}^{-1/2}</math>)</u>	<u>PHASE (<math>^\circ</math>)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>	
0.011 ± 0.004	65 ± 30	SOKHOYAN	15A	DPWA	Multichannel

## **$N(2100)$ BREIT-WIGNER PHOTON DECAY AMPLITUDES**

### **$N(2100) \rightarrow p\gamma$ , helicity-1/2 amplitude $A_{1/2}$**

<u>VALUE (GeV<sup>-1/2</sup>)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
0.032 ± 0.014	<sup>1</sup> HUNT	19	DPWA Multichannel
0.010 ± 0.004	SOKHOYAN	15A	DPWA Multichannel

<sup>1</sup>Statistical error only.

### **$N(2100) \rightarrow n\gamma$ , helicity-1/2 amplitude $A_{1/2}$**

<u>VALUE (GeV<sup>-1/2</sup>)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
0.026 ± 0.013	<sup>1</sup> HUNT	19	DPWA Multichannel

<sup>1</sup>Statistical error only.

## **$N(2100)$ REFERENCES**

MUELLER	20	PL B803 135323	J. Mueller <i>et al.</i>	(CBELSA/TAPS Collab.)
HUNT	19	PR C99 055205	B.C. Hunt, D.M. Manley	
ANISOVICH	17B	PL B771 142	A.V. Anisovich <i>et al.</i>	
ANISOVICH	17C	PL B772 247	A.V. Anisovich <i>et al.</i>	
DENISENKO	16	PL B755 97	I. Denisenko <i>et al.</i>	
SOKHOYAN	15A	EPJ A51 95	V. Sokhoyan <i>et al.</i>	(CBELSA/TAPS Collab.)
SVARC	14	PR C89 045205	A. Svarc <i>et al.</i>	(RBI Zagreb, UNI Tuzla)
BATINIC	10	PR C82 038203	M. Batinic <i>et al.</i>	(ZAGR)
ABLIKIM	06K	PRL 97 062001	M. Ablikim <i>et al.</i>	(BES II Collab.)
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 <i>et al.</i>	(CMU, LBL) IJP
Also		PR D20 2839	R.E. Cutkosky <i>et al.</i>	(CMU, LBL)
HOEHLER	79	PDAT 12-1	G. Hohler <i>et al.</i>	(KARLT) IJP
Also		Toronto Conf. 3	R. Koch	(KARLT) IJP