

$N(2120) 3/2^-$

$$I(J^P) = \frac{1}{2}(3/2^-) \text{ Status: } **$$

OMITTED FROM SUMMARY TABLE

Before the 2012 *Review*, all the evidence for a $J^P = 3/2^-$ state with a mass above 1800 MeV was filed under a two-star $N(2080)$.

There is now evidence from ANISOVICH 12A for two $3/2^-$ states in this region, so we have split the older data (according to mass) between a three-star $N(1875)$ and a two-star $N(2120)$.

 $N(2120)$ BREIT-WIGNER MASS

<u>VALUE (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
2120 OUR ESTIMATE			
2150 ± 60	ANISOVICH	12A	DPWA Multichannel
2060 ± 80	¹ CUTKOSKY	80	IPWA $\pi N \rightarrow \pi N$
2081 ± 20	HOEHLER	79	IPWA $\pi N \rightarrow \pi N$

 $N(2120)$ BREIT-WIGNER WIDTH

<u>VALUE (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
330 ± 45	ANISOVICH	12A	DPWA Multichannel
300 ± 100	CUTKOSKY	80	IPWA $\pi N \rightarrow \pi N$ (higher m)
265 ± 40	HOEHLER	79	IPWA $\pi N \rightarrow \pi N$

 $N(2120)$ POLE POSITION**REAL PART**

<u>VALUE (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
2110 ± 50	ANISOVICH	12A	DPWA Multichannel
2050 ± 70	CUTKOSKY	80	IPWA $\pi N \rightarrow \pi N$ (higher m)

−2×IMAGINARY PART

<u>VALUE (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
340 ± 45	ANISOVICH	12A	DPWA Multichannel
200 ± 80	CUTKOSKY	80	IPWA $\pi N \rightarrow \pi N$ (higher m)

 $N(2120)$ ELASTIC POLE RESIDUE**MODULUS $|r|$**

<u>VALUE (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
13 ± 3	ANISOVICH	12A	DPWA Multichannel
30 ± 20	CUTKOSKY	80	IPWA $\pi N \rightarrow \pi N$ (higher m)

PHASE θ

<u>VALUE (°)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
−20 ± 10	ANISOVICH	12A	DPWA Multichannel
0 ± 100	CUTKOSKY	80	IPWA $\pi N \rightarrow \pi N$ (higher m)

N(2120) INELASTIC POLE RESIDUE

The “normalized residue” is the residue divided by $\Gamma_{pole}/2$.

Normalized residue in $N\pi \rightarrow N(2120) \rightarrow \Lambda K$

<u>MODULUS (%)</u>	<u>PHASE (°)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
3±1	100 ± 30	ANISOVICH	12A DPWA	Multichannel

Normalized residue in $N\pi \rightarrow N(2120) \rightarrow \Sigma K$

<u>MODULUS (%)</u>	<u>PHASE (°)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
2±1.5	-50 ± 40	ANISOVICH	12A DPWA	Multichannel

N(2120) DECAY MODES

Mode
Γ_1 $N\pi$

N(2120) BRANCHING RATIOS

<u>$\Gamma(N\pi)/\Gamma_{total}$</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>	<u>Γ_1/Γ</u>
6±2	ANISOVICH	12A DPWA	Multichannel	
14±7	CUTKOSKY	80 IPWA	$\pi N \rightarrow \pi N$ (higher m)	
6±2	HOEHLER	79 IPWA	$\pi N \rightarrow \pi N$	

N(2120) PHOTON DECAY AMPLITUDES

$N(2120) \rightarrow p\gamma$, helicity-1/2 amplitude $A_{1/2}$

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
0.125±0.045	² ANISOVICH	12A DPWA	Phase = (-55 ± 20)°

$N(2120) \rightarrow p\gamma$, helicity-3/2 amplitude $A_{3/2}$

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
0.150±0.060	² ANISOVICH	12A DPWA	Phase = (-35 ± 15)°

N(2120) FOOTNOTES

¹ CUTKOSKY 80 finds a lower mass D_{13} resonance, as well as one in this region. Both are listed here.

² This ANISOVICH 12A value is the complex helicity amplitude at the pole position.

N(2120) REFERENCES

ANISOVICH	12A	EPJ A48 15	A.V. Anisovich <i>et al.</i>	(BONN, PNPI)
CUTKOSKY	80	Toronto Conf. 19	R.E. Cutkosky <i>et al.</i>	(CMU, LBL)
HOEHLER	79	PDAT 12-1	G. Hohler <i>et al.</i>	(KARLT)