$N(1860)\ 5/2^+$

$I(J^P) = \frac{1}{2}(\frac{5}{2}^+)$ Status: **

OMITTED FROM SUMMARY TABLE

Before the 2012 *Review*, all the evidence for a $J^P = 5/2^+$ state with a mass above 1800 MeV was filed under a two-star $N(2000)$. There is now some evidence from ANISOVICH 12A for two $5/2^+$ states in this region, so we have split the older data (according to mass) between two two-star $5/2^+$ states, an $N(1860)$ and an $N(2000)$.

N(1860) POLE POSITION

REAL PART

VALUE (MeV)	*DOCUMENT ID*		*TECN*	*COMMENT*
$1834 \pm 19 \pm 6$	[1] SVARC	14	L+P	$\pi N \to \pi N$
1830^{+120}_{-60}	ANISOVICH	12A	DPWA	Multichannel
1807	ARNDT	06	DPWA	$\pi N \to \pi N, \eta N$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
1863	SHRESTHA	12A	DPWA	Multichannel

−2×IMAGINARY PART

VALUE (MeV)	*DOCUMENT ID*		*TECN*	*COMMENT*
$122 \pm 34 \pm 7$	[1] SVARC	14	L+P	$\pi N \to \pi N$
250^{+150}_{-50}	ANISOVICH	12A	DPWA	Multichannel
109	ARNDT	06	DPWA	$\pi N \to \pi N, \eta N$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
189	SHRESTHA	12A	DPWA	Multichannel

N(1860) ELASTIC POLE RESIDUE

MODULUS $|r|$

VALUE (MeV)	*DOCUMENT ID*		*TECN*	*COMMENT*
$4 \pm 1 \pm 1$	[1] SVARC	14	L+P	$\pi N \to \pi N$
50 ± 20	ANISOVICH	12A	DPWA	Multichannel
60	ARNDT	06	DPWA	$\pi N \to \pi N, \eta N$

PHASE θ

VALUE (°)	*DOCUMENT ID*		*TECN*	*COMMENT*
$-39 \pm 18 \pm 9$	[1] SVARC	14	L+P	$\pi N \to \pi N$
-80 ± 40	ANISOVICH	12A	DPWA	Multichannel
−67	ARNDT	06	DPWA	$\pi N \to \pi N, \eta N$

N(1860) BREIT-WIGNER MASS

VALUE (MeV)	*DOCUMENT ID*		*TECN*	*COMMENT*
1820 to 1960 (≈ 1860) OUR ESTIMATE				
1860^{+120}_{-60}	ANISOVICH	12A	DPWA	Multichannel

1817.7	ARNDT	06	DPWA	$\pi N \to \pi N, \eta N$
1882 ± 10	HOEHLER	79	IPWA	$\pi N \to \pi N$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
1900 ± 7	SHRESTHA	12A	DPWA	Multichannel

N(1860) BREIT-WIGNER WIDTH

VALUE (MeV)	DOCUMENT ID		TECN	COMMENT
$270\ ^{+140}_{-\ 50}$	ANISOVICH	12A	DPWA	Multichannel
117.6	ARNDT	06	DPWA	$\pi N \to \pi N, \eta N$
95 ± 20	HOEHLER	79	IPWA	$\pi N \to \pi N$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
219 ± 23	SHRESTHA	12A	DPWA	Multichannel

N(1860) DECAY MODES

	Mode	Fraction (Γ_i/Γ)
Γ_1	$N\pi$	4–20 %
Γ_2	$N\eta$	seen
Γ_3	$N\pi\pi$	
Γ_4	$N\sigma$	seen
Γ_5	$p\gamma$	
Γ_6	$p\gamma$, helicity=1/2	seen
Γ_7	$p\gamma$, helicity=3/2	seen
Γ_8	$n\gamma$	
Γ_9	$n\gamma$, helicity=1/2	
Γ_{10}	$n\gamma$, helicity=3/2	

N(1860) BRANCHING RATIOS

$\Gamma(N\pi)/\Gamma_{total}$ Γ_1/Γ

VALUE (%)	DOCUMENT ID		TECN	COMMENT
20 ±6	ANISOVICH	12A	DPWA	Multichannel
12.7	ARNDT	06	DPWA	$\pi N \to \pi N, \eta N$
4 ±2	HOEHLER	79	IPWA	$\pi N \to \pi N$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
17 ±1	SHRESTHA	12A	DPWA	Multichannel

$\Gamma(N\eta)/\Gamma_{total}$ Γ_2/Γ

VALUE (%)	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
4±2	SHRESTHA	12A	DPWA	Multichannel

$\Gamma(N\sigma)/\Gamma_{total}$ Γ_4/Γ

VALUE (%)	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
41±6	SHRESTHA	12A	DPWA	Multichannel

N(1860) BREIT-WIGNER PHOTON DECAY AMPLITUDES

N(1860) → *pγ*, helicity-1/2 amplitude $A_{1/2}$

VALUE ($GeV^{-1/2}$)	*DOCUMENT ID*	*TECN*	*COMMENT*
• • • We do not use the following data for averages, fits, limits, etc. • • •			
-0.017 ± 0.003	SHRESTHA 12A	DPWA	Multichannel

N(1860) → *pγ*, helicity-3/2 amplitude $A_{3/2}$

VALUE	*DOCUMENT ID*	*TECN*	*COMMENT*
• • • We do not use the following data for averages, fits, limits, etc. • • •			
0.029 ± 0.004	SHRESTHA 12A	DPWA	Multichannel

N(1860) → *nγ*, helicity-1/2 amplitude $A_{1/2}$

VALUE ($GeV^{-1/2}$)	*DOCUMENT ID*	*TECN*	*COMMENT*
0.021 ± 0.013	ANISOVICH 13B	DPWA	Multichannel
• • • We do not use the following data for averages, fits, limits, etc. • • •			
0.010 ± 0.005	SHRESTHA 12A	DPWA	Multichannel

N(1860) → *nγ*, helicity-3/2 amplitude $A_{3/2}$

VALUE ($GeV^{-1/2}$)	*DOCUMENT ID*	*TECN*	*COMMENT*
0.034 ± 0.017	ANISOVICH 13B	DPWA	Multichannel
• • • We do not use the following data for averages, fits, limits, etc. • • •			
-0.009 ± 0.005	SHRESTHA 12A	DPWA	Multichannel

N(1860) FOOTNOTES

[1] Fit to the amplitudes of HOEHLER 79.

N(1860) REFERENCES

SVARC	14	PR C89 045205	A. Svarc *et al.*	
ANISOVICH	13B	EPJ A49 67	A.V. Anisovich *et al.*	
ANISOVICH	12A	EPJ A48 15	A.V. Anisovich *et al.*	(BONN, PNPI)
SHRESTHA	12A	PR C86 055203	M. Shrestha, D.M. Manley	(KSU)
ARNDT	06	PR C74 045205	R.A. Arndt *et al.*	(GWU)
HOEHLER	79	PDAT 12-1	G. Hohler *et al.*	(KARLT)