NODE=B139

$\Delta(2000)$ $5/2^+$

$I(J^P) = \frac{3}{2}(\frac{5}{2}^+)$ Status: ∗∗

OMITTED FROM SUMMARY TABLE

$\Delta(2000)$ POLE POSITION

NODE=B139215

REAL PART

NODE=B139RE
NODE=B139RE

VALUE (MeV)	DOCUMENT ID		TECN	COMMENT
1998± 4±4	[1] SVARC	14	L+P	$\pi N \to \pi N$
1976	SHRESTHA	12A	DPWA	Multichannel
2150±100	CUTKOSKY	80	IPWA	$\pi N \to \pi N$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
1697	VRANA	00	DPWA	Multichannel

OCCUR=2

[1] Fit to the amplitudes of HOEHLER 79.

NODE=B139RE;LINKAGE=SV

−2×IMAGINARY PART

NODE=B139IM
NODE=B139IM

VALUE (MeV)	DOCUMENT ID		TECN	COMMENT
404± 10±4	[1] SVARC	14	L+P	$\pi N \to \pi N$
350±100	CUTKOSKY	80	IPWA	$\pi N \to \pi N$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
488	SHRESTHA	12A	DPWA	Multichannel
112	VRANA	00	DPWA	Multichannel

OCCUR=2

[1] Fit to the amplitudes of HOEHLER 79.

NODE=B139IM;LINKAGE=SV

$\Delta(2000)$ ELASTIC POLE RESIDUE

NODE=B139220

MODULUS $|r|$

NODE=B139RER
NODE=B139RER

VALUE (MeV)	DOCUMENT ID		TECN	COMMENT
34±1±1	[1] SVARC	14	L+P	$\pi N \to \pi N$
16±5	CUTKOSKY	80	IPWA	$\pi N \to \pi N$

OCCUR=2

[1] Fit to the amplitudes of HOEHLER 79.

NODE=B139RER;LINKAGE=SV

PHASE θ

NODE=B139IMR
NODE=B139IMR

VALUE (°)	DOCUMENT ID		TECN	COMMENT
110± 1±3	[1] SVARC	14	L+P	$\pi N \to \pi N$
150±90	CUTKOSKY	80	IPWA	$\pi N \to \pi N$

OCCUR=2

[1] Fit to the amplitudes of HOEHLER 79.

NODE=B139IMR;LINKAGE=SV

$\Delta(2000)$ BREIT-WIGNER MASS

NODE=B139M

NODE=B139M

VALUE (MeV)	DOCUMENT ID		TECN	COMMENT
2015± 24	[1] SHRESTHA	12A	DPWA	Multichannel
2200±125	CUTKOSKY	80	IPWA	$\pi N \to \pi N$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
1724± 61	VRANA	00	DPWA	Multichannel
1752± 32	MANLEY	92	IPWA	$\pi N \to \pi N$ & $N \pi\pi$

OCCUR=2

[1] Statistical error only.

NODE=B139M;LINKAGE=A

$\Delta(2000)$ BREIT-WIGNER WIDTH

NODE=B139W

NODE=B139W

VALUE (MeV)	DOCUMENT ID		TECN	COMMENT
500± 52	[1] SHRESTHA	12A	DPWA	Multichannel
400±125	CUTKOSKY	80	IPWA	$\pi N \to \pi N$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
138± 68	VRANA	00	DPWA	Multichannel
251± 93	MANLEY	92	IPWA	$\pi N \to \pi N$ & $N \pi\pi$

OCCUR=2

[1] Statistical error only.

NODE=B139W;LINKAGE=A

Δ(2000) DECAY MODES

NODE=B139225;NODE=B139

	Mode	Fraction (Γ_i/Γ)	
Γ_1	$N\pi$	3–11 %	DESIG=1;OUR EST
Γ_2	$N\pi\pi$	>87 %	DESIG=3;OUR EST
Γ_3	$\Delta(1232)\pi$	<9 %	DESIG=7;OUR EST
Γ_4	$\Delta(1232)\pi$, P-wave	<6 %	DESIG=11;OUR EST
Γ_5	$\Delta(1232)\pi$, F-wave	<3 %	DESIG=12;OUR EST
Γ_6	$N\rho$, S=3/2, P-wave	seen	DESIG=2;OUR EST
Γ_7	$N(1440)\pi$		DESIG=13
Γ_8	$N(1520)\pi$, S-wave		DESIG=14
Γ_9	$N(1535)\pi$		DESIG=15
Γ_{10}	$N\gamma$		DESIG=4
Γ_{11}	$N\gamma$, helicity=1/2	seen	DESIG=5;OUR EST
Γ_{12}	$N\gamma$, helicity=3/2	seen	DESIG=6;OUR EST

Δ(2000) BRANCHING RATIOS

NODE=B139230

$\Gamma(N\pi)/\Gamma_{total}$ — Γ_1/Γ

NODE=B139R2
NODE=B139R2

VALUE (%)	DOCUMENT ID		TECN	COMMENT
11±5	SEIFEN	25	DPWA	Multichannel
7±1	[1] SHRESTHA	12A	DPWA	Multichannel
7±4	CUTKOSKY	80	IPWA	$\pi N \to \pi N$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0±1	VRANA	00	DPWA	Multichannel
2±1	MANLEY	92	IPWA	$\pi N \to \pi N$ & $N\pi\pi$

OCCUR=2

[1] Statistical error only.

NODE=B139R2;LINKAGE=A

$\Gamma(\Delta(1232)\pi, P\text{-wave})/\Gamma_{total}$ — Γ_4/Γ

NODE=B139R5
NODE=B139R5

VALUE (%)	DOCUMENT ID		TECN	COMMENT
14±6	SEIFEN	25	DPWA	Multichannel
3±3	[1] SHRESTHA	12A	DPWA	Multichannel
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0±1	VRANA	00	DPWA	Multichannel

[1] Statistical error only.

NODE=B139R5;LINKAGE=A

$\Gamma(\Delta(1232)\pi, F\text{-wave})/\Gamma_{total}$ — Γ_5/Γ

NODE=B139R6
NODE=B139R6

VALUE (%)	DOCUMENT ID		TECN	COMMENT
3±2	SEIFEN	25	DPWA	Multichannel
< 3	SHRESTHA	12A	DPWA	Multichannel
• • • We do not use the following data for averages, fits, limits, etc. • • •				
40±1	VRANA	00	DPWA	Multichannel

$\Gamma(N\rho, S\text{=3/2}, P\text{-wave})/\Gamma_{total}$ — Γ_6/Γ

NODE=B139R7
NODE=B139R7

VALUE (%)	DOCUMENT ID		TECN	COMMENT
90± 3	[1] SHRESTHA	12A	DPWA	Multichannel
• • • We do not use the following data for averages, fits, limits, etc. • • •				
60±60	VRANA	00	DPWA	Multichannel

[1] Statistical error only.

NODE=B139R7;LINKAGE=A

$\Gamma(N(1440)\pi)/\Gamma_{total}$ — Γ_7/Γ

NODE=B139R00
NODE=B139R00

VALUE (%)	DOCUMENT ID		TECN	COMMENT
9±6	SEIFEN	25	DPWA	Multichannel

$\Gamma(N(1520)\pi, S\text{-wave})/\Gamma_{total}$ — Γ_8/Γ

NODE=B139R01
NODE=B139R01

VALUE (%)	DOCUMENT ID		TECN	COMMENT
<1	SEIFEN	25	DPWA	Multichannel

$\Gamma(N(1535)\pi)/\Gamma_{total}$ — Γ_9/Γ

NODE=B139R02
NODE=B139R02

VALUE (%)	DOCUMENT ID		TECN	COMMENT
<1	SEIFEN	25	DPWA	Multichannel

Δ(2000) BREIT-WIGNER PHOTON DECAY AMPLITUDES

NODE=B139235

Δ(2000) → $p\gamma$, helicity-1/2 amplitude $A_{1/2}$

NODE=B139A01
NODE=B139A01

VALUE ($GeV^{-1/2}$)	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
-0.061 ± 0.018	[1] SHRESTHA	12A	DPWA	Multichannel

[1] Statistical error only.

NODE=B139A01;LINKAGE=A

Δ(2000) → $p\gamma$, helicity-3/2 amplitude $A_{3/2}$

NODE=B139A02
NODE=B139A02

VALUE ($GeV^{-1/2}$)	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.158 ± 0.032	[1] SHRESTHA	12A	DPWA	Multichannel

[1] Statistical error only.

NODE=B139A02;LINKAGE=A

Δ(2000) REFERENCES

NODE=B139

SEIFEN	25	EPJ A61 173	T. Seifen *et al.*	(CBELSA/TAPS Collab.)
SVARC	14	PR C89 045205	A. Svarc *et al.*	(RBI Zagreb, UNI Tuzla)
SHRESTHA	12A	PR C86 055203	M. Shrestha, D.M. Manley	(KSU)
VRANA	00	PRPL 328 181	T.P. Vrana, S.A. Dytman, T.-S.H. Lee	(PITT, ANL)
MANLEY	92	PR D45 4002	D.M. Manley, E.M. Saleski	(KSA) IJP
Also		PR D30 904	D.M. Manley *et al.*	(VPI)
CUTKOSKY	80	Toronto Conf. 19	R.E. Cutkosky *et al.*	(CMU, LBL)
Also		PR D20 2839	R.E. Cutkosky *et al.*	(CMU, LBL)
HOEHLER	79	PDAT 12-1	G. Hohler *et al.*	(KARLT)

REFID=63593
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