$\Delta(1750)$ P_{31}

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

OMITTED FROM SUMMARY TABLE

$\Delta(1750)$ BREIT-WIGNER MASS

VALUE (MeV)	*DOCUMENT ID*		*TECN*	*COMMENT*
≈ 1750 OUR ESTIMATE				
1744 ±36	MANLEY	92	IPWA	$\pi N \to \pi N$ & $N\pi\pi$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
1712 ± 1	PENNER	02C	DPWA	Multichannel
1721 ±61	VRANA	00	DPWA	Multichannel
1715.2±21.0	[1] CHEW	80	BPWA	$\pi^+ p \to \pi^+ p$
1778.4± 9.0	[1] CHEW	80	BPWA	$\pi^+ p \to \pi^+ p$

$\Delta(1750)$ BREIT-WIGNER WIDTH

VALUE (MeV)	*DOCUMENT ID*		*TECN*	*COMMENT*
300 ±120	MANLEY	92	IPWA	$\pi N \to \pi N$ & $N\pi\pi$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
643 ± 17	PENNER	02C	DPWA	Multichannel
70 ± 50	VRANA	00	DPWA	Multichannel
93.3± 55.0	[1] CHEW	80	BPWA	$\pi^+ p \to \pi^+ p$
23.0± 29.0	[1] CHEW	80	BPWA	$\pi^+ p \to \pi^+ p$

$\Delta(1750)$ POLE POSITION

REAL PART

VALUE (MeV)	*DOCUMENT ID*		*TECN*	*COMMENT*
1748	[2] ARNDT	04	DPWA	$\pi N \to \pi N$, ηN
• • • We do not use the following data for averages, fits, limits, etc. • • •				
1714	VRANA	00	DPWA	Multichannel

−2×IMAGINARY PART

VALUE (MeV)	*DOCUMENT ID*		*TECN*	*COMMENT*
524	[2] ARNDT	04	DPWA	$\pi N \to \pi N$, ηN
• • • We do not use the following data for averages, fits, limits, etc. • • •				
68	VRANA	00	DPWA	Multichannel

$\Delta(1750)$ ELASTIC POLE RESIDUE

MODULUS $|r|$

VALUE (MeV)	*DOCUMENT ID*		*TECN*	*COMMENT*
48	[2] ARNDT	04	DPWA	$\pi N \to \pi N$, ηN

PHASE θ

VALUE (°)	*DOCUMENT ID*		*TECN*	*COMMENT*
158	[2] ARNDT	04	DPWA	$\pi N \to \pi N$, ηN

$\Delta(1750)$ DECAY MODES

	Mode
Γ_1	$N\pi$
Γ_2	$N\pi\pi$
Γ_3	$\quad N(1440)\pi$
Γ_4	ΣK

$\Delta(1750)$ BRANCHING RATIOS

$\Gamma(N\pi)/\Gamma_{\text{total}}$ — Γ_1/Γ

VALUE	DOCUMENT ID		TECN	COMMENT
0.08 ± 0.03	MANLEY	92	IPWA	$\pi N \rightarrow \pi N$ & $N\pi\pi$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.01 ± 0.01	PENNER	02C	DPWA	Multichannel
0.06 ± 0.09	VRANA	00	DPWA	Multichannel
0.18	[1] CHEW	80	BPWA	$\pi^+ p \rightarrow \pi^+ p$
0.20	[1] CHEW	80	BPWA	$\pi^+ p \rightarrow \pi^+ p$

$(\Gamma_i\Gamma_f)^{1/2}/\Gamma_{\text{total}}$ in $N\pi \rightarrow \Delta(1700) \rightarrow N(1440)\pi$ — $(\Gamma_1\Gamma_3)^{1/2}/\Gamma$

VALUE	DOCUMENT ID		TECN	COMMENT
$+0.15\pm0.03$	MANLEY	92	IPWA	$\pi N \rightarrow \pi N$ & $N\pi\pi$

$\Gamma(N(1440)\pi)/\Gamma_{\text{total}}$ — Γ_3/Γ

VALUE	DOCUMENT ID		TECN	COMMENT
0.83 ± 0.01	VRANA	00	DPWA	Multichannel

$\Gamma(\Sigma K)/\Gamma_{\text{total}}$ — Γ_4/Γ

VALUE	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.001 ± 0.001	PENNER	02C	DPWA	Multichannel

$\Delta(1750)$ PHOTON DECAY AMPLITUDES

$\Delta(1750) \rightarrow N\gamma$, 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. • • •				
0.053	PENNER	02D	DPWA	Multichannel

$\Delta(1750)$ FOOTNOTES

[1] CHEW 80 reports four resonances in the P_{31} wave — see also the $\Delta(1910)$. Problems with this analysis are discussed in section 2.1.11 of HOEHLER 83.

[2] ARNDT 04 gives no corresponding Breit-Wigner parameters for this state, because the mass so obtained is about 500 MeV higher than that suggested by the position of the pole.

Δ(1750) REFERENCES

ARNDT	04	PR C69 035213	R.A. Arndt *et al.*	(GWU, TRIU)
PENNER	02C	PR C66 055211	G. Penner, U. Mosel	(GIES)
PENNER	02D	PR C66 055212	G. Penner, U. Mosel	(GIES)
VRANA	00	PRPL 328 181	T.P. Vrana, S.A. Dytman,, T.-S.H. Lee	(PITT+)
MANLEY	92	PR D45 4002	D.M. Manley, E.M. Saleski	(KENT)
Also	84	PR D30 904	D.M. Manley *et al.*	(VPI)
HOEHLER	83	Landolt-Boernstein 1/9B2	G. Hohler	(KARLT)
CHEW	80	Toronto Conf. 123	D.M. Chew	(LBL)