

# Δ(1750) P<sub>31</sub>

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

OMITTED FROM SUMMARY TABLE

The latest GWU analysis (ARNDT 06) finds no evidence for this resonance.

## Δ(1750) BREIT-WIGNER MASS

<u>VALUE (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>≈ 1750 OUR ESTIMATE</b>			
1744 ± 36	MANLEY	92	IPWA π N → π N & N π π
● ● ● 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	<sup>1</sup> CHEW	80	BPWA π <sup>+</sup> p → π <sup>+</sup> p
1778.4 ± 9.0	<sup>1</sup> CHEW	80	BPWA π <sup>+</sup> p → π <sup>+</sup> p

## Δ(1750) BREIT-WIGNER WIDTH

<u>VALUE (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
300 ± 120	MANLEY	92	IPWA π N → π N & N π π
● ● ● 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	<sup>1</sup> CHEW	80	BPWA π <sup>+</sup> p → π <sup>+</sup> p
23.0 ± 29.0	<sup>1</sup> CHEW	80	BPWA π <sup>+</sup> p → π <sup>+</sup> p

## Δ(1750) POLE POSITION

### REAL PART

<u>VALUE (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
1748	<sup>2</sup> ARNDT	04	DPWA π N → π N, η N
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●			
1714	VRANA	00	DPWA Multichannel

### − 2×IMAGINARY PART

<u>VALUE (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
524	<sup>2</sup> ARNDT	04	DPWA π N → π N, η N
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●			
68	VRANA	00	DPWA Multichannel

## Δ(1750) ELASTIC POLE RESIDUE

### MODULUS |r|

<u>VALUE (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
48	<sup>2</sup> ARNDT	04	DPWA π N → π N, η N

## PHASE $\theta$

VALUE ( $^\circ$ )	DOCUMENT ID	TECN	COMMENT
158	<sup>2</sup> ARNDT	04	DPWA $\pi N \rightarrow \pi N, \eta N$

## $\Delta(1750)$ DECAY MODES

Mode
$\Gamma_1$ $N\pi$
$\Gamma_2$ $N\pi\pi$
$\Gamma_3$ $N(1440)\pi$
$\Gamma_4$ $\Sigma K$

## $\Delta(1750)$ BRANCHING RATIOS

### $\Gamma(N\pi)/\Gamma_{\text{total}}$ $\Gamma_1/\Gamma$

VALUE	DOCUMENT ID	TECN	COMMENT
$0.08 \pm 0.03$	MANLEY	92	IPWA $\pi N \rightarrow \pi N \& N\pi\pi$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●			
$0.01 \pm 0.01$	PENNER	02C	DPWA Multichannel
$0.06 \pm 0.09$	VRANA	00	DPWA Multichannel
0.18	<sup>1</sup> CHEW	80	BPWA $\pi^+ p \rightarrow \pi^+ p$
0.20	<sup>1</sup> 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
$+0.15 \pm 0.03$	MANLEY	92	IPWA $\pi N \rightarrow \pi N \& N\pi\pi$

### $\Gamma(N(1440)\pi)/\Gamma_{\text{total}}$ $\Gamma_3/\Gamma$

VALUE	DOCUMENT ID	TECN	COMMENT
$0.83 \pm 0.01$	VRANA	00	DPWA Multichannel

### $\Gamma(\Sigma K)/\Gamma_{\text{total}}$ $\Gamma_4/\Gamma$

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

## $\Delta(1750)$ PHOTON DECAY AMPLITUDES

Papers on  $\gamma N$  amplitudes predating 1981 may be found in our 2006 edition, Journal of Physics, G **33** 1 (2006).

### $\Delta(1750) \rightarrow N\gamma$ , helicity-1/2 amplitude $A_{1/2}$

VALUE ( $\text{GeV}^{-1/2}$ )	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

<sup>1</sup> 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.

<sup>2</sup> 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.

## $\Delta(1750)$ REFERENCES

ARNDT	06	PR C74 045205	R.A. Arndt <i>et al.</i>	(GWU)
PDG	06	JPG 33 1	W.-M. Yao <i>et al.</i>	(PDG Collab.)
ARNDT	04	PR C69 035213	R.A. Arndt <i>et al.</i>	(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		PR D30 904	D.M. Manley <i>et al.</i>	(VPI)
HOEHLER	83	Landolt-Boernstein 1/9B2	G. Hohler	(KARLT)
CHEW	80	Toronto Conf. 123	D.M. Chew	(LBL)