$\rho(1450)$

$I^G(J^{PC}) = 1^+(1^{--})$

See the mini-review under the $\rho(1700)$.

$\rho(1450)$ MASS

VALUE (MeV)	DOCUMENT ID
1465±25 OUR ESTIMATE	This is only an educated guess; the error given is larger than the error on the average of the published values.
1449± 8 OUR AVERAGE	Includes data from the 4 datablocks that follow this one.

MIXED MODES

VALUE (MeV)	DOCUMENT ID	TECN	COMMENT
The data in this block is included in the average printed for a previous datablock.			
• • • We do not use the following data for averages, fits, limits, etc. • • •			
1265.5±75.3	DUBNICKA 89	RVUE	$e^+e^- \to \pi^+\pi^-$

$\eta\rho^0$ MODE

VALUE (MeV)	DOCUMENT ID	TECN	COMMENT
The data in this block is included in the average printed for a previous datablock.			
1470±20	ANTONELLI 88	DM2	$e^+e^- \to \eta\pi^+\pi^-$
1446±10	FUKUI 88	SPEC	8.95 $\pi^- p \to \eta\pi^+\pi^- n$

$\pi^+\pi^-$ MODE

VALUE (MeV)	DOCUMENT ID	TECN	COMMENT
The data in this block is included in the average printed for a previous datablock.			
1424±25	BISELLO 89	DM2	$e^+e^- \to \pi^+\pi^-$

$\omega\pi$ MODE

VALUE (MeV)	DOCUMENT ID	TECN	COMMENT
The data in this block is included in the average printed for a previous datablock.			
1463±25	[1] CLEGG 94	RVUE	
• • • We do not use the following data for averages, fits, limits, etc. • • •			
1250	[2] ASTON 80C	OMEG	20–70 $\gamma p \to \omega\pi^0 p$
1290±40	[2] BARBER 80C	SPEC	3–5 $\gamma p \to \omega\pi^0 p$

[1] Using data from BISELLO 91B, DOLINSKY 86 and ALBRECHT 87L.
[2] Not separated from $b_1(1235)$, not pure $J^P = 1^-$ effect.

$\phi\pi$ MODE

VALUE (MeV)	DOCUMENT ID	TECN	CHG	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
1480±40	[3] BITYUKOV 87	SPEC	0	32.5 $\pi^- p \to \phi\pi^0 n$

[3] See the minireview for $\rho(1700)$ and ACHASOV 88 for a non-exotic interpretation. DONNACHIE 91 suggests this is a different particle.

$\rho(1450)$ WIDTH

VALUE (MeV)	DOCUMENT ID
310±60 OUR ESTIMATE	This is only an educated guess; the error given is larger than the error on the average of the published values.

$\omega\pi$ MODE

VALUE (MeV)	DOCUMENT ID	TECN	COMMENT
The data in this block is included in the average printed for a previous datablock.			
311± 62	[4] CLEGG 94	RVUE	
• • • We do not use the following data for averages, fits, limits, etc. • • •			
300	[5] ASTON 80C	OMEG	20–70 $\gamma p \to \omega\pi^0 p$
320±100	[5] BARBER 80C	SPEC	3–5 $\gamma p \to \omega\pi^0 p$

[4] Using data from BISELLO 91B, DOLINSKY 86 and ALBRECHT 87L.
[5] Not separated from $b_1(1235)$, not pure $J^P = 1^-$ effect.

MIXED MODES

VALUE (MeV)	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
391 ± 70	DUBNICKA	89	RVUE	$e^+e^- \to \pi^+\pi^-$

$\eta\rho^0$ MODE

VALUE (MeV)	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
230 ± 30	ANTONELLI	88	DM2	$e^+e^- \to \eta\pi^+\pi^-$
60 ± 15	FUKUI	88	SPEC	8.95 $\pi^- p \to \eta\pi^+\pi^- n$

$\pi^+\pi^-$ MODE

VALUE (MeV)	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
269 ± 31	BISELLO	89	DM2	$e^+e^- \to \pi^+\pi^-$

$\phi\pi$ MODE

VALUE (MeV)	DOCUMENT ID		TECN	CHG	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
130 ± 60	[6] BITYUKOV	87	SPEC	0	32.5 $\pi^- p \to \phi\pi^0 n$

[6] See the minireview for $\rho(1700)$ and ACHASOV 88 for a non-exotic interpretation. DONNACHIE 91 suggests this is a different particle.

$\rho(1450)$ DECAY MODES

	Mode	Fraction (Γ_i/Γ)	Confidence level
Γ_1	$\pi\pi$	seen	
Γ_2	4π	seen	
Γ_3	e^+e^-	seen	
Γ_4	$\eta\rho$	< 4 %	
Γ_5	$\omega\pi$	< 2.0 %	95%
Γ_6	$\phi\pi$	< 1 %	
Γ_7	$K\overline{K}$	$< 1.6 \times 10^{-3}$	95%

$\rho(1450)$ $\Gamma(i)\Gamma(e^+e^-)/\Gamma(\text{total})$

$\Gamma(\pi\pi) \times \Gamma(e^+e^-)/\Gamma_{\text{total}}$ $\Gamma_1\Gamma_3/\Gamma$

VALUE (keV)	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.12	[7] DIEKMAN	88	RVUE	$e^+e^- \to \pi^+\pi^-$

[7] Using total width = 235 MeV.

$\Gamma(\eta\rho) \times \Gamma(e^+e^-)/\Gamma_{\text{total}}$ $\Gamma_4\Gamma_3/\Gamma$

VALUE (eV)	DOCUMENT ID		TECN	COMMENT
91 ± 19	ANTONELLI	88	DM2	$e^+e^- \to \eta\pi^+\pi^-$

$\Gamma(\phi\pi) \times \Gamma(e^+e^-)/\Gamma_{\text{total}}$ $\Gamma_6\Gamma_3/\Gamma$

VALUE (eV)	CL%	DOCUMENT ID		TECN	COMMENT
< 70	90	[8] AULCHENKO	87B	ND	$e^+e^- \to K^0_S K^0_L \pi^0$

[8] Using mass 1480 ± 40 MeV and total width 130 ± 60 MeV of BITYUKOV 87.

$\rho(1450)$ BRANCHING RATIOS

$\Gamma(\eta\rho)/\Gamma_{\text{total}}$ Γ_4/Γ

VALUE	DOCUMENT ID		TECN
< 0.04	DONNACHIE	87B	RVUE

$\Gamma(\phi\pi)/\Gamma(\omega\pi)$ Γ_6/Γ_5

VALUE	CL%	DOCUMENT ID		TECN	CHG	COMMENT
> 0.5	95	BITYUKOV	87	SPEC	0	32.5 $\pi^- p \to \phi\pi^0 n$

$\Gamma(\omega\pi)/\Gamma(4\pi)$ **Γ_5/Γ_2**

VALUE	DOCUMENT ID		TECN
<0.14	CLEGG	88	RVUE

$\Gamma(\eta\rho)/\Gamma(\omega\pi)$ **Γ_4/Γ_5**

VALUE	DOCUMENT ID		TECN	COMMENT
~ 0.24	[9] DONNACHIE	91	RVUE	

• • • We do not use the following data for averages, fits, limits, etc. • • •

>2	FUKUI	91	SPEC	8.95 $\pi^- p \rightarrow \omega\pi^0 n$

$\Gamma(\omega\pi)/\Gamma_{total}$ **Γ_5/Γ**

VALUE	DOCUMENT ID		TECN
~ 0.21	CLEGG	94	RVUE

$\Gamma(\pi\pi)/\Gamma(\omega\pi)$ **Γ_1/Γ_5**

VALUE	DOCUMENT ID		TECN
~ 0.32	CLEGG	94	RVUE

$\Gamma(\phi\pi)/\Gamma_{total}$ **Γ_6/Γ**

VALUE	DOCUMENT ID		TECN
<0.01	[9] DONNACHIE	91	RVUE

$\Gamma(K\overline{K})/\Gamma(\omega\pi)$ **Γ_7/Γ_5**

VALUE	DOCUMENT ID		TECN
<0.08	[9] DONNACHIE	91	RVUE

[9] Using data from BISELLO 91B, DOLINSKY 86 and ALBRECHT 87L.

$\rho(1450)$ REFERENCES

CLEGG	94	ZPHY C62 455	+Donnachie	(LANC, MCHS)
BISELLO	91B	NP B21 111 (suppl)		(DM2 Collab.)
DONNACHIE	91	ZPHY C51 689	+Clegg	(MCHS, LANC)
FUKUI	91	PL B257 241	+Horikawa+	(SUGI, NAGO, KEK, KYOT, MIYA)
BISELLO	89	PL B220 321	+Busetto+	(DM2 Collab.)
DUBNICKA	89	JPG 15 1349	+Martinovic+	(JINR, SLOV)
ACHASOV	88	PL B207 199	+Kozhevnikov	(NOVM)
ANTONELLI	88	PL B212 133	+Baldini+	(DM2 Collab.)
CLEGG	88	ZPHY C40 313	+Donnachie	(MCHS, LANC)
DIEKMAN	88	PRPL 159 101		(BONN)
FUKUI	88	PL B202 441	+Horikawa+	(SUGI, NAGO, KEK, KYOT, MIYA)
ALBRECHT	87L	PL B185 223	+Binder, Boeckmann, Glaser+	(ARGUS Collab.)
AULCHENKO	87B	JETPL 45 145	+Dolinsky, Druzhinin, Dubrovin+	(NOVO)
		Translated from ZETFP 45 118.		
BITYUKOV	87	PL B188 383	+Dzhelyadin, Dorofeev, Golovkin+	(SERP)
DONNACHIE	87B	ZPHY C34 257	+Clegg	(MCHS, LANC)
DOLINSKY	86	PL B174 453	+Druzhinin, Dubrovin, Eidelman+	(NOVO)
ASTON	80C	PL 92B 211	(BONN, CERN, EPOL, GLAS, LANC, MCHS+)	
BARBER	80C	ZPHY C4 169	+Dainton, Brodbeck, Brookes+	(DARE, LANC, SHEF)

OTHER RELATED PAPERS

MURADOV	94	PAN 57 864		(BAKU)
LANDSBERG	92	SJNP 55 1051		(SERP)
		Translated from YAF 55 1896.		
BRAU	88	PR D37 2379	+Franek+	(SLAC Hybrid Facility Photon Collab.)
ASTON	87	NP B292 693	+Awaji, D'Amore+	(SLAC, NAGO, CINC, INUS)
KURDADZE	86	JETPL 43 643	+Lelchuk, Pakhtusova, Sidorov, Skrinskii+	(NOVO)
		Translated from ZETFP 43 497.		
BARKOV	85	NP B256 365	+Chilingarov, Eidelman, Khazin, Lelchuk+	(NOVO)
BISELLO	85	LAL 85-15	+Augustin, Ajaltouni+	(PADO, LALO, CLER, FRAS)
ABE	84B	PRL 53 751	+Bacon, Ballam+	(SLAC Hybrid Facility Photon Collab.)
ATKINSON	84C	NP B243 1	+ (BONN, CERN, GLAS, LANC, MCHS, CURIN+)	
CORDIER	82	PL 109B 129	+Bisello, Bizot, Buon, Delcourt	(LALO)
KILLIAN	80	PR D21 3005	+Treadwell, Ahrens, Berkelman, Cassel+	(CORN)
COSME	76	PL 63B 352	+Courau, Dudelzak, Grelaud, Jean-Marie+	(ORSAY)
BINGHAM	72B	PL 41B 635	+Rabin, Rosenfeld, Smadja+	(LBL, UCB, SLAC)
FRENKIEL	72	NP B47 61	+Ghesquiere, Lillestol, Chung+	(CDEF, CERN)
LAYSSAC	71	NC 6A 134	+Renard	(MONP)