$f_0(1370)$
was $f_0(1300)$

$I^G(J^{PC}) = 0^+(0^{++})$

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$f_0(1370)$ T-MATRIX POLE POSITION

Note that $\Gamma \approx 2\ \mathrm{Im}(\sqrt{s_{\mathrm{pole}}})$.

VALUE (MeV)	*DOCUMENT ID*		*TECN*	*COMMENT*
(1200–1500)−*i*(150–250) OUR ESTIMATE				
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$(1380 \pm 40)-i(180 \pm 25)$	ABELE	96B	CBAR	0.0 $\overline{p}p \rightarrow \pi^0 K^0_L K^0_L$
$(1300 \pm 15)-i(115 \pm 8)$	BUGG	96	RVUE	
$(1330 \pm 50)-i(150 \pm 40)$	[1] AMSLER	95B	CBAR	$\overline{p}p \rightarrow 3\pi^0$
$(1360 \pm 35)-i(150–300)$	[1] AMSLER	95C	CBAR	$\overline{p}p \rightarrow \pi^0\eta\eta$
$(1390 \pm 30)-i(190 \pm 40)$	[2] AMSLER	95D	CBAR	$\overline{p}p \rightarrow 3\pi^0,\ \pi^0\eta\eta,\ \pi^0\pi^0\eta$
$1346 - i249$	[3,4] JANSSEN	95	RVUE	$\pi\pi \rightarrow \pi\pi,\ K\overline{K}$
$1214 - i168$	[4,5] TORNQVIST	95	RVUE	$\pi\pi \rightarrow \pi\pi,\ K\overline{K},\ K\pi,\ \eta\pi$
$1364 - i139$	AMSLER	94D	CBAR	$\overline{p}p \rightarrow \pi^0\pi^0\eta$
$(1365^{+20}_{-55})-i(134 \pm 35)$	ANISOVICH	94	CBAR	$\overline{p}p \rightarrow 3\pi^0,\pi^0\eta\eta$
$(1340 \pm 40)-i(127^{+30}_{-20})$	[6] BUGG	94	RVUE	$\overline{p}p \rightarrow 3\pi^0,\ \eta\eta\pi^0,\ \eta\pi^0\pi^0$
$1515 - i214$	[4,7] ZOU	93	RVUE	$\pi\pi \rightarrow \pi\pi,\ K\overline{K}$
$1420 - i220$	[8] AU	87	RVUE	$\pi\pi \rightarrow \pi\pi,\ K\overline{K}$

[1] Supersedes ANISOVICH 94.

[2] Coupled-channel analysis of $\overline{p}p \rightarrow 3\pi^0$, $\pi^0\eta\eta$, and $\pi^0\pi^0\eta$ on sheet IV. Demonstrates explicitly that f_0(400–1200) and f_0(1370) are two different poles.

[3] Analysis of data from FALVARD 88.

[4] The pole is on Sheet III. Demonstrates explicitly that f_0(400–1200) and f_0(1370) are two different poles.

[5] Uses data from BEIER 72B, OCHS 73, HYAMS 73, GRAYER 74, ROSSELET 77, CASON 83, ASTON 88, and ARMSTRONG 91B. Coupled channel analysis with flavor symmetry and all light two-pseudoscalars systems.

[6] Reanalysis of ANISOVICH 94 data.

[7] Analysis of data from OCHS 73, GRAYER 74, and ROSSELET 77.

[8] Analysis of data from OCHS 73,GRAYER 74, BECKER 79, and CASON 83.

$f_0(1370)$ BREIT-WIGNER MASS OR K-MATRIX POLE PARAMETER

VALUE (MeV)	*DOCUMENT ID*
1200 to 1500 OUR ESTIMATE	

$\pi\pi$ MODE

VALUE (MeV)	*DOCUMENT ID*		*TECN*	*COMMENT*
• • • We do not use the following data for averages, fits, limits, etc. • • •				
1186	[9] TORNQVIST	95	RVUE	$\pi\pi \rightarrow \pi\pi$, $K\overline{K}$, $K\pi$, $\eta\pi$
1472±12	ARMSTRONG	91	OMEG	300 $pp \rightarrow pp\pi\pi$, $ppK\overline{K}$
1275±20	BREAKSTONE	90	SFM	62 $pp \rightarrow pp\pi^+\pi^-$
1420±20	AKESSON	86	SPEC	63 $pp \rightarrow pp\pi^+\pi^-$
1256	FROGGATT	77	RVUE	$\pi^+\pi^-$ channel

[9] Uses data from BEIER 72B, OCHS 73, HYAMS 73, GRAYER 74, ROSSELET 77, CASON 83, ASTON 88, and ARMSTRONG 91B. Coupled channel analysis with flavor symmetry and all light two-pseudoscalars systems.

$K\overline{K}$ MODE

VALUE (MeV)	*DOCUMENT ID*		*TECN*	*COMMENT*
• • • We do not use the following data for averages, fits, limits, etc. • • •				
1440±20	CHEN	91	MRK3	$J/\psi \rightarrow \gamma\pi^+\pi^-$, $\gamma K\overline{K}$
1440±50	BOLONKIN	88	SPEC	40 $\pi^- p \rightarrow K^0_S K^0_S n$
1463± 9	ETKIN	82B	MPS	23 $\pi^- p \rightarrow n 2K^0_S$
1425±15	WICKLUND	80	SPEC	6 $\pi N \rightarrow K^+ K^- N$
~ 1300	POLYCHRO...	79	STRC	7 $\pi^- p \rightarrow n 2K^0_S$

4π MODE $2(\pi\pi)_S+\rho\rho$

VALUE (MeV)	*DOCUMENT ID*		*TECN*	*COMMENT*
• • • We do not use the following data for averages, fits, limits, etc. • • •				
1374±38	AMSLER	94	CBAR	0.0 $\overline{p}p \rightarrow \pi^+\pi^- 3\pi^0$
1345±12	ADAMO	93	OBLX	$\overline{n}p \rightarrow 3\pi^+ 2\pi^-$
1386±30	GASPERO	93	DBC	0.0 $\overline{p}n \rightarrow 2\pi^+ 3\pi^-$

$\eta\eta$ MODE

VALUE (MeV)	*DOCUMENT ID*		*TECN*	*COMMENT*
• • • We do not use the following data for averages, fits, limits, etc. • • •				
1430	AMSLER	92	CBAR	0.0 $\overline{p}p \rightarrow \pi^0\eta\eta$
1220±40	ALDE	86D	GAM4	100 $\pi^- p \rightarrow n 2\eta$

$f_0(1370)$ BREIT-WIGNER WIDTH

VALUE (MeV)	DOCUMENT ID
300 to 500 OUR ESTIMATE	

$\pi\pi$ MODE

VALUE (MeV)	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
350	[10] TORNQVIST	95	RVUE	$\pi\pi \to \pi\pi$, $K\overline{K}$, $K\pi$, $\eta\pi$
195 ± 33	ARMSTRONG	91	OMEG	300 $pp \to pp\pi\pi$, $ppK\overline{K}$
285 ± 60	BREAKSTONE	90	SFM	62 $pp \to pp\pi^+\pi^-$
460 ± 50	AKESSON	86	SPEC	63 $pp \to pp\pi^+\pi^-$
~ 400	[11] FROGGATT	77	RVUE	$\pi^+\pi^-$ channel

[10] Uses data from BEIER 72B, OCHS 73, HYAMS 73, GRAYER 74, ROSSELET 77, CASON 83, ASTON 88, and ARMSTRONG 91B. Coupled channel analysis with flavor symmetry and all light two-pseudoscalars systems.

[11] Width defined as distance between 45 and 135° phase shift.

$K\overline{K}$ MODE

VALUE (MeV)	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
160 ± 40	CHEN	91	MRK3	$J/\psi \to \gamma\pi^+\pi^-$, $\gamma K\overline{K}$
250 ± 80	BOLONKIN	88	SPEC	40 $\pi^- p \to K^0_S K^0_S n$
118^{+138}_{-16}	ETKIN	82B	MPS	23 $\pi^- p \to n2K^0_S$
160 ± 30	WICKLUND	80	SPEC	6 $\pi N \to K^+K^-N$
~ 150	POLYCHRO...	79	STRC	7 $\pi^- p \to n2K^0_S$

4π MODE $2(\pi\pi)_S+\rho\rho$

VALUE (MeV)	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
375 ± 61	AMSLER	94	CBAR	0.0 $\overline{p}p \to \pi^+\pi^- 3\pi^0$
398 ± 26	ADAMO	93	OBLX	$\overline{n}p \to 3\pi^+ 2\pi^-$
310 ± 50	GASPERO	93	DBC	0.0 $\overline{p}n \to 2\pi^+ 3\pi^-$

$\eta\eta$ MODE

VALUE (MeV)	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
250	AMSLER	92	CBAR	0.0 $\overline{p}p \to \pi^0\eta\eta$
320 ± 40	ALDE	86D	GAM4	100 $\pi^- p \to n2\eta$

$f_0(1370)$ DECAY MODES

In two-particle decay modes the $\pi\pi$ decay is dominant. We include here the resonance observed in 4π under the same entry as the one decaying to 2 pseudoscalars. See also the minireview under non-$q\overline{q}$ candidates.

	Mode	Fraction (Γ_i/Γ)
Γ_1	$\pi\pi$	seen
Γ_2	4π	seen
Γ_3	$4\pi^0$	
Γ_4	$2\pi^+2\pi^-$	seen
Γ_5	$\pi^+\pi^-2\pi^0$	seen
Γ_6	$\rho\rho$	
Γ_7	$2(\pi\pi)_S$	
Γ_8	$\eta\eta$	seen
Γ_9	$K\overline{K}$	seen
Γ_{10}	$\gamma\gamma$	seen
Γ_{11}	e^+e^-	not seen

$f_0(1370)$ PARTIAL WIDTHS

$\Gamma(\gamma\gamma)$ — Γ_{10}

VALUE (eV)	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
5.4±2.3	MORGAN	90	RVUE	$\gamma\gamma \rightarrow \pi^+\pi^-$, $\pi^0\pi^0$

$\Gamma(e^+e^-)$ — Γ_{11}

VALUE (eV)	CL%	DOCUMENT ID		TECN	COMMENT
<20	90	VOROBYEV	88	ND	$e^+e^- \rightarrow \pi^0\pi^0$

$f_0(1370)$ BRANCHING RATIOS

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

VALUE	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.26±0.09	BUGG	96	RVUE	
<0.15	[12] AMSLER	94	CBAR	$\overline{p}p \rightarrow \pi^+\pi^-3\pi^0$
<0.20	GASPERO	93	DBC	0.0 $\overline{p}n \rightarrow$ hadrons

[12] Using AMSLER 95B ($3\pi^0$).

$\Gamma(4\pi)/\Gamma_{total}$ — $\Gamma_2/\Gamma = (\Gamma_3+\Gamma_4+\Gamma_5)/\Gamma$

VALUE	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.80±0.04	GASPERO	93	DBC	0.0 $\overline{p}n \rightarrow$ hadrons

$\Gamma(2\pi^+ 2\pi^-)/\Gamma(4\pi)$ — $\Gamma_4/\Gamma_2 = \Gamma_4/(\Gamma_3+\Gamma_4+\Gamma_5)$

VALUE	*DOCUMENT ID*		*TECN*	*COMMENT*
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.420 ± 0.014	[13] GASPERO	93	DBC	0.0 $\overline{p}n \to 2\pi^+ 3\pi^-$

[13] Model-dependent evaluation.

$\Gamma(\pi^+\pi^- 2\pi^0)/\Gamma(4\pi)$ — $\Gamma_5/\Gamma_2 = \Gamma_5/(\Gamma_3+\Gamma_4+\Gamma_5)$

VALUE	*DOCUMENT ID*		*TECN*	*COMMENT*
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.512 ± 0.019	[14] GASPERO	93	DBC	0.0 $\overline{p}n \to$ hadrons

[14] Model-dependent evaluation.

$\Gamma(\rho\rho)/\Gamma(2(\pi\pi)_S)$ — Γ_6/Γ_7

VALUE	*DOCUMENT ID*		*TECN*	*COMMENT*
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$1.6\ \pm0.2$	AMSLER	94	CBAR	$\overline{p}p \to \pi^+\pi^- 3\pi^0$
0.58 ± 0.16	GASPERO	93	DBC	0.0 $\overline{p}n \to 2\pi^+ 3\pi^-$

$\Gamma(K\overline{K})/\Gamma_{total}$ — Γ_9/Γ

VALUE	*DOCUMENT ID*		*TECN*
• • • We do not use the following data for averages, fits, limits, etc. • • •			
0.35 ± 0.13	BUGG	96	RVUE

$f_0(1370)$ REFERENCES

ABELE	96B	PL B385 425	+Adomeit, Amsler+	(Crystal Barrel Collab.)	
BUGG	96	NP B471 59	+Sarantsev, Zou	(LOQM, PNPI)	
AMSLER	95B	PL B342 433	+Armstrong, Brose+	(Crystal Barrel Collab.)	
AMSLER	95C	PL B353 571	+Armstrong, Hackman+	(Crystal Barrel Collab.)	
AMSLER	95D	PL B355 425	+Armstrong, Spanier+	(Crystal Barrel Collab.)	
JANSSEN	95	PR D52 2690	+Pearce, Holinde, Speth	(STON, ADLD, JULI)	
TORNQVIST	95	ZPHY C68 647		(HELS)	
AMSLER	94	PL B322 431	+Armstrong, Meyer+	(Crystal Barrel Collab.)	JPC
AMSLER	94D	PL B333 277	+Anisovich, Spanier+	(Crystal Barrel Collab.)	
ANISOVICH	94	PL B323 233	+Armstrong+	(Crystal Barrel Collab.)	JPC
BUGG	94	PR D50 4412	+Anisovich+	(LOQM)	
ADAMO	93	NP A558 13C	+Agnello+	(OBELIX Collab.)	JPC
GASPERO	93	NP A562 407		(ROMAI)	JPC
ZOU	93	PR D48 R3948	+Bugg	(LOQM)	
AMSLER	92	PL B291 347	+Augustin, Baker+	(Crystal Barrel Collab.)	
ARMSTRONG	91	ZPHY C51 351	+Benayoun+	(ATHU, BARI, BIRM, CERN, CDEF)	
ARMSTRONG	91B	ZPHY C52 389	+Barnes+	(ATHU, BARI, BIRM, CERN, CDEF)	
CHEN	91	Hadron 91 Conf.		(Mark III Collab.)	
SLAC-PUB-5669					
BREAKSTONE	90	ZPHY C48 569	+	(ISU, BGNA, CERN, DORT, HEIDH, WARS)	
MORGAN	90	ZPHY C48 623	+Pennington	(RAL, DURH)	
ASTON	88	NP B296 493	+Awaji, Bienz, Bird+	(SLAC, NAGO, CINC, INUS)	
BOLONKIN	88	NP B309 426	+Bloshenko, Gorin+	(ITEP, SERP)	
FALVARD	88	PR D38 2706	+Ajaltouni+	(CLER, FRAS, LALO, PADO)	
VOROBYEV	88	SJNP 48 273	+Golubev, Dolinsky, Druzhinin+	(NOVO)	
		Translated from YAF 48 436.			

AU	87	PR D35 1633	+Morgan, Pennington	(DURH, RAL)
AKESSON	86	NP B264 154	+Albrow, Almehed+	(Axial Field Spec. Collab.)
ALDE	86D	NP B269 485	+Binon, Bricman+	(BELG, LAPP, SERP, CERN, LANL)
CASON	83	PR D28 1586	+Cannata, Baumbaugh, Bishop+	(NDAM, ANL)
ETKIN	82B	PR D25 1786	+Foley, Lai+	(BNL, CUNY, TUFTS, VAND)
WICKLUND	80	PRL 45 1469	+Ayres, Cohen, Diebold, Pawlicki	(ANL)
BECKER	79	NP B151 46	+Blanar, Blum+	(MPIM, CERN, ZEEM, CRAC)
POLYCHRO...	79	PR D19 1317	Polychronakos, Cason, Bishop+	(NDAM, ANL)
FROGGATT	77	NP B129 89	+Petersen	(GLAS, NORD)
ROSSELET	77	PR D15 574	+Extermann, Fischer, Guisan+	(GEVA, SACL)
GRAYER	74	NP B75 189	+Hyams, Blum, Dietl+	(CERN, MPIM)
HYAMS	73	NP B64 134	+Jones, Weilhammer, Blum, Dietl+	(CERN, MPIM)
OCHS	73	Thesis		(MPIM, MUNI)
BEIER	72B	PRL 29 511	+Buchholtz, Mann+	(PENN)

OTHER RELATED PAPERS

ANISOVICH	97	PL B395 123	+Anisovich, Sarantsev	(PNPI)
PROKOSHKIN	97	SPD 42 117	+Kondashov, Sadovsky	(SERP)
		Translated from DANS 353 323.		
TORNQVIST	96	PRL 76 1575	+Roos	(HELS)
GASPERO	95	NP A588 861		(ROMA)
LI	91	PR D43 2161	+Close, Barnes+	(TENN)
BIZZARRI	69	NP B14 169	+Foster, Gavillet, Montanet+	(CERN, CDEF)
BETTINI	66	NC 42A 695	+Cresti, Limentani, Bertanza, Bigi+	(PADO, PISA)