$f_2(2150)$

$I^G(J^{PC}) = 0^+(2^{++})$

OMITTED FROM SUMMARY TABLE

This entry was previously called T_0.

$f_2(2150)$ MASS

$f_2(2150)$ MASS, COMBINED MODES (MeV)

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	COMMENT
2156±11 OUR AVERAGE		Includes data from the 2 datablocks that follow this one.			
• • • We do not use the following data for averages, fits, limits, etc. • • •					
2170± 6	80k	[1] UMAN	06	E835	5.2 $\overline{p}p \to \eta\eta\pi^0$

[1] Statistical error only.

$\eta\eta$ MODE

VALUE (MeV)	DOCUMENT ID		TECN	COMMENT
The data in this block is included in the average printed for a previous datablock.				
2157±12 OUR AVERAGE				
2151±16	BARBERIS	00E		450 $pp \to p_f \eta\eta p_s$
2175±20	PROKOSHKIN	95D	GAM4	300 $\pi^- N \to \pi^- N 2\eta$, 450 $pp \to pp2\eta$
2130±35	SINGOVSKI	94	GAM4	450 $pp \to pp2\eta$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
2140±30	[2] ABELE	99B	CBAR	
seen	[3] ANISOVICH	99B	SPEC	1.35–1.94 $\overline{p}p \to \eta\eta\pi^0$
2105±10	[3] ANISOVICH	99K	RVUE	0.6–1.94 $\overline{p}p \to \eta\eta, \eta\eta'$
2104±20	[4] ARMSTRONG	93C	E760	$\overline{p}p \to \pi^0\eta\eta \to 6\gamma$

[2] Spin not determined.
[3] $J^{PC} = 0^{++}$.
[4] No J^{PC} determination.

$\eta\pi\pi$ MODE

VALUE (MeV)	DOCUMENT ID		TECN	CHG	COMMENT
The data in this block is included in the average printed for a previous datablock.					
2135±20±45	ADOMEIT	96	CBAR	0	1.94 $\overline{p}p \to \eta 3\pi^0$

$\overline{p}p \to \pi\pi$

VALUE (MeV)	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
~ 2226	HASAN	94	RVUE	$\overline{p}p \to \pi\pi$
~ 2090	[5] OAKDEN	94	RVUE	0.36–1.55 $\overline{p}p \to \pi\pi$
~ 2120	[6] OAKDEN	94	RVUE	0.36–1.55 $\overline{p}p \to \pi\pi$
~ 2170	[7] MARTIN	80B	RVUE	
~ 2150	[7] MARTIN	80C	RVUE	
~ 2150	[8] DULUDE	78B	OSPK	1–2 $\overline{p}p \to \pi^0\pi^0$

[5] OAKDEN 94 makes an amplitude analysis of LEAR data on $\overline{p}p \to \pi\pi$ using a method based on Barrelet zeros. This is solution A. The amplitude analysis of HASAN 94 includes earlier data as well, and assume that the data can be parametrized in terms of towers of nearly degenerate resonances on the leading Regge trajectory. See also KLOET 96 and MARTIN 97 who make related analyses.
[6] From solution B of amplitude analysis of data on $\overline{p}p \to \pi\pi$.
[7] $I(J^P) = 0(2^+)$ from simultaneous analysis of $p\overline{p} \to \pi^-\pi^+$ and $\pi^0\pi^0$.
[8] $I^G(J^P) = 0^+(2^+)$ from partial-wave amplitude analysis.

S-CHANNEL $\overline{p}p$, $\overline{N}N$ or $\overline{K}K$

VALUE (MeV)	DOCUMENT ID		TECN	CHG	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
2139^{+8}_{-9}	[9] EVANGELIS...	97	SPEC		0.6-2.4 $\overline{p}p \to K^0_S K^0_S$
~ 2190	[9] CUTTS	78B	CNTR		0.97–3 $\overline{p}p \to \overline{N}N$
2155±15	[9,10] COUPLAND	77	CNTR	0	0.7–2.4 $\overline{p}p \to \overline{p}p$
2193± 2	[9,11] ALSPECTOR	73	CNTR		$\overline{p}p$ S channel

[9] Isospins 0 and 1 not separated.
[10] From a fit to the total elastic cross section.
[11] Referred to as T or T region by ALSPECTOR 73.

$K\overline{K}$ MODE

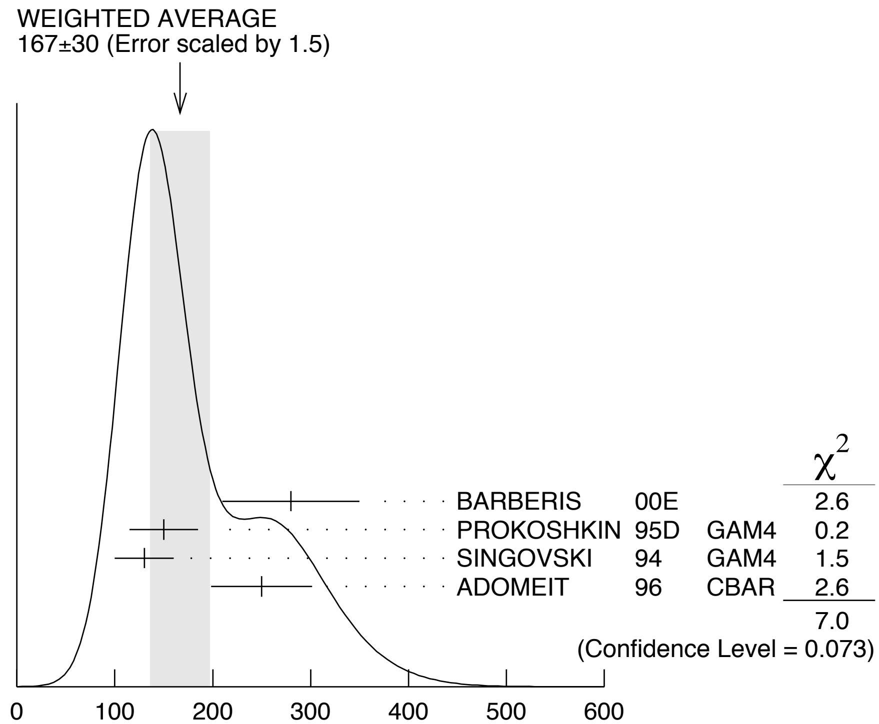
VALUE (MeV)	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
2200±13	VLADIMIRSK...	06	SPEC	40 $\pi^- p \to K^0_S K^0_S n$
2150±20	ABLIKIM	04E	BES2	$J/\psi \to \omega K^+ K^-$
2130±35	BARBERIS	99	OMEG	450 $pp \to p_s p_f K^+ K^-$

$f_2(2150)$ WIDTH

$f_2(2150)$ WIDTH, COMBINED MODES (MeV)

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	COMMENT
167±30 OUR AVERAGE Includes data from the 2 datablocks that follow this one. Error includes scale factor of 1.5. See the ideogram below.					
• • • We do not use the following data for averages, fits, limits, etc. • • •					
182±11	80k	[12] UMAN	06	E835	5.2 $\overline{p}p \to \eta\eta\pi^0$

[12] Statistical error only.

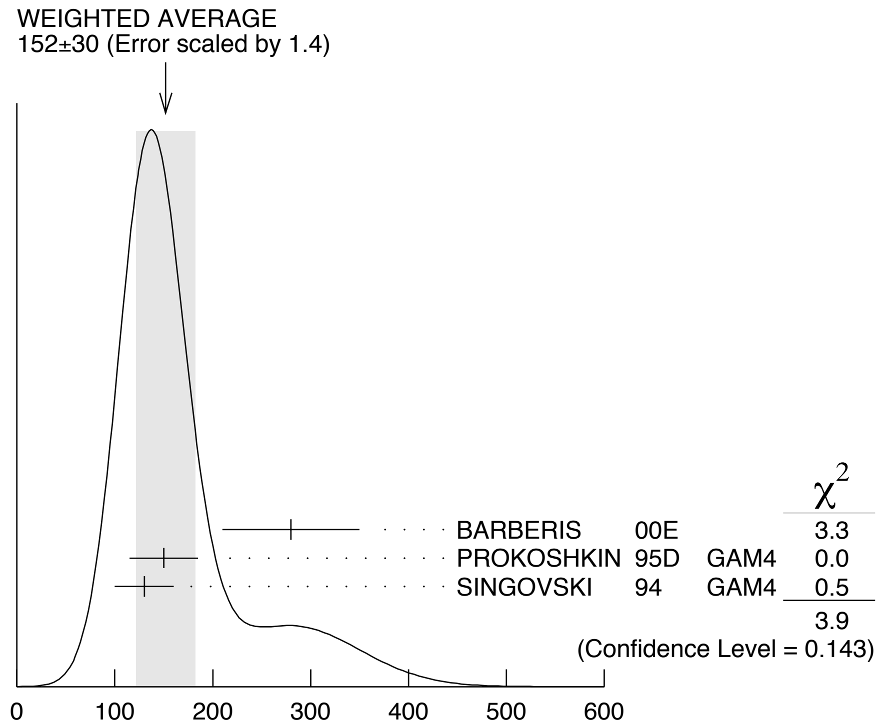


f_2(2150) WIDTH, COMBINED MODES (MeV)

$\eta\eta$ MODE

VALUE (MeV)	*DOCUMENT ID*		*TECN*	*COMMENT*
The data in this block is included in the average printed for a previous datablock.				
152±30 OUR AVERAGE	Error includes scale factor of 1.4. See the ideogram below.			
280±70	BARBERIS	00E		450 $pp \to p_f \eta\eta p_s$
150±35	PROKOSHKIN	95D	GAM4	300 $\pi^- N \to \pi^- N 2\eta$, 450 $pp \to pp2\eta$
130±30	SINGOVSKI	94	GAM4	450 $pp \to pp2\eta$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
310±50	[13] ABELE	99B	CBAR	
seen	[14] ANISOVICH	99B	SPEC	1.35–1.94 $\overline{p}p \to \eta\eta\pi^0$
200±25	[15] ANISOVICH	99K	RVUE	0.6–1.94 $\overline{p}p \to \eta\eta$, $\eta\eta'$
203±10	[16] ARMSTRONG	93C	E760	$\overline{p}p \to \pi^0\eta\eta \to 6\gamma$

[13] Spin not determined.
[14] $J^{PC} = 0^{++}$
[15] PWA gives $J^{PC} = 0^{++}$.
[16] No J^{PC} determination.



$f_2(2150)$ WIDTH, $\eta\eta$ MODE (MeV)

$\eta\pi\pi$ MODE

VALUE (MeV)	DOCUMENT ID		TECN	CHG	COMMENT
The data in this block is included in the average printed for a previous datablock.					
250±25±45	ADOMEIT	96	CBAR	0	1.94 $\overline{p}p \to \eta 3\pi^0$

$\overline{p}p \to \pi\pi$

VALUE (MeV)	DOCUMENT ID		TECN	COMMENT
250 OUR ESTIMATE				
• • • We do not use the following data for averages, fits, limits, etc. • • •				
~ 226	HASAN	94	RVUE	$\overline{p}p \to \pi\pi$
~ 70	[17] OAKDEN	94	RVUE	0.36–1.55 $\overline{p}p \to \pi\pi$
~ 250	[18] MARTIN	80B	RVUE	
~ 250	[18] MARTIN	80C	RVUE	
~ 250	[19] DULUDE	78B	OSPK	1–2 $\overline{p}p \to \pi^0\pi^0$

[17] See however KLOET 96 who fit $\pi^+\pi^-$ only and find waves only up to $J = 3$ to be important but not significantly resonant.

[18] $I(J^P) = 0(2^+)$ from simultaneous analysis of $p\overline{p} \to \pi^-\pi^+$ and $\pi^0\pi^0$.

[19] $I^G(J^P) = 0^+(2^+)$ from partial-wave amplitude analysis.

S-CHANNEL $\overline{p}p$, $\overline{N}N$ or $\overline{K}K$

VALUE (MeV)	DOCUMENT ID		TECN	CHG	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
56^{+31}_{-16}	[20] EVANGELIS...	97	SPEC		0.6-2.4 $\overline{p}p \to K^0_S K^0_S$
135±75	[21,22] COUPLAND	77	CNTR	0	0.7–2.4 $\overline{p}p \to \overline{p}p$
98± 8	[22] ALSPECTOR	73	CNTR		$\overline{p}p$ *S* channel

[20] Isospin 0 and 2 not separated.
[21] From a fit to the total elastic cross section.
[22] Isospins 0 and 1 not separated.

$K\overline{K}$ MODE

VALUE (MeV)	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
91±62	VLADIMIRSK...	06	SPEC	40 $\pi^- p \to K^0_S K^0_S n$
150±30	ABLIKIM	04E	BES2	$J/\psi \to \omega K^+ K^-$
270±50	BARBERIS	99	OMEG	450 $p p \to p_s p_f K^+ K^-$

$f_2(2150)$ DECAY MODES

	Mode	Fraction (Γ_i/Γ)
Γ_1	$\pi\pi$	
Γ_2	$\eta\eta$	seen
Γ_3	$K\overline{K}$	seen
Γ_4	$f_2(1270)\eta$	seen
Γ_5	$a_2(1320)\pi$	seen

$f_2(2150)$ BRANCHING RATIOS

$\Gamma(K\overline{K})/\Gamma(\eta\eta)$ — Γ_3/Γ_2

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
1.28±0.23		BARBERIS	00E		450 $p p \to p_f \eta\eta p_s$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<0.1	95	[23] PROKOSHKIN	95D	GAM4	300 $\pi^- N \to \pi^- N 2\eta$, 450 $p p \to p p 2\eta$

[23] Using data from ARMSTRONG 89D.

$\Gamma(\pi\pi)/\Gamma(\eta\eta)$ — Γ_1/Γ_2

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<0.33	95	[24] PROKOSHKIN	95D	GAM4	300 $\pi^- N \to \pi^- N 2\eta$, 450 $p p \to p p 2\eta$

[24] Derived from a $\pi^0\pi^0/\eta\eta$ limit.

$\Gamma(f_2(1270)\eta)/\Gamma(a_2(1320)\pi)$ — Γ_4/Γ_5

VALUE	DOCUMENT ID		TECN	COMMENT
0.79±0.11	[25] ADOMEIT	96	CBAR	1.94 $\overline{p} p \to \eta 3\pi^0$

[25] Using B($a_2(1320) \to \eta\pi$) = 0.145

f_2(2150) REFERENCES

UMAN	06	PR D73 052009	I. Uman *et al.*	(FNAL E835)
VLADIMIRSK...	06	PAN 69 493	V.V. Vladimirsky *et al.*	(ITEP, Moscow)
		Translated from YAF 69 515.		
ABLIKIM	04E	PL B603 138	M. Ablikim *et al.*	(BES Collab.)
BARBERIS	00E	PL B479 59	D. Barberis *et al.*	(WA 102 Collab.)
ABELE	99B	EPJ C8 67	A. Abele *et al.*	(Crystal Barrel Collab.)
ANISOVICH	99B	PL B449 154	A.V. Anisovich *et al.*	
ANISOVICH	99K	PL B468 309	A.V. Anisovich *et al.*	
BARBERIS	99	PL B453 305	D. Barberis *et al.*	(Omega Expt.)
EVANGELIS...	97	PR D56 3803	C. Evangelista *et al.*	(LEAR Collab.)
MARTIN	97	PR C56 1114	B.R. Martin, G.C. Oades	(LOUC, AARH)
ADOMEIT	96	ZPHY C71 227	J. Adomeit *et al.*	(Crystal Barrel Collab.)
KLOET	96	PR D53 6120	W.M. Kloet, F. Myhrer	(RUTG, NORD)
PROKOSHKIN	95D	SPD 40 495	Y.D. Prokoshkin	(SERP) IGJPC
		Translated from DANS 344 469.		
HASAN	94	PL B334 215	A. Hasan, D.V. Bugg	(LOQM)
OAKDEN	94	NP A574 731	M.N. Oakden, M.R. Pennington	(DURH)
SINGOVSKI	94	NC 107A 1911	A.V. Singovsky	(SERP)
ARMSTRONG	93C	PL B307 394	T.A. Armstrong *et al.*	(FNAL, FERR, GENO+)
ARMSTRONG	89D	PL B227 186	T.A. Armstrong, M. Benayoun	(ATHU, BARI, BIRM+)
MARTIN	80B	NP B176 355	B.R. Martin, D. Morgan	(LOUC, RHEL) JP
MARTIN	80C	NP B169 216	A.D. Martin, M.R. Pennington	(DURH) JP
CUTTS	78B	PR D17 16	D. Cutts *et al.*	(STON, WISC)
DULUDE	78B	PL 79B 335	R.S. Dulude *et al.*	(BROW, MIT, BARI) JP
COUPLAND	77	PL 71B 460	M. Coupland *et al.*	(LOQM, RHEL)
ALSPECTOR	73	PRL 30 511	J. Alspector *et al.*	(RUTG, UPNJ)

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ANISOVICH	05A	JETPL 81 417	V.V. Anisovich, A.V. Sarantsev	
		Translated from ZETFP 81 531.		
ANISOVICH	05C	IJMP A20 6327	V.V. Anisovich, M.A. Matveev, A.V. Sarantsev	
EISENHAND...	75	NP B96 109	E. Eisenhandler *et al.*	(LOQM, LIVP, DARE+)
FIELDS	71	PRL 27 1749	T. Fields *et al.*	(ANL, OXF)
YOH	71	PRL 26 922	J.K. Yoh *et al.*	(CIT, BNL, ROCH)