

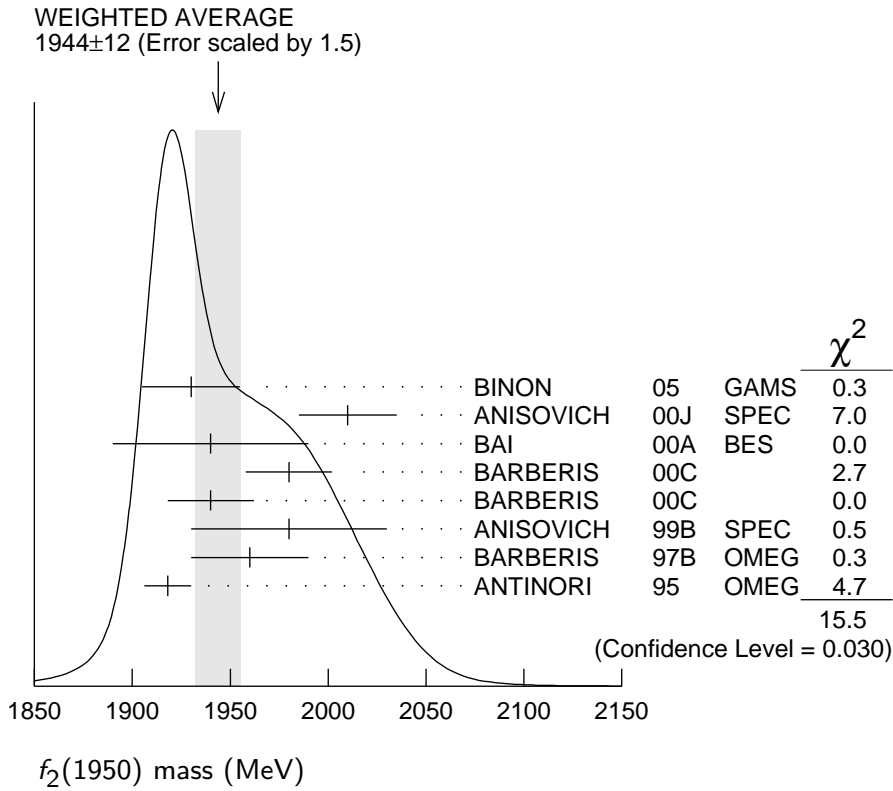
$f_2(1950)$

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

 $f_2(1950)$ MASS

VALUE (MeV)	DOCUMENT ID	TECN	COMMENT
1944±12 OUR AVERAGE	Error includes scale factor of 1.5. See the ideogram below.		
1930±25	¹ BINON	05	GAMS 33 $\pi^- p \rightarrow \eta\eta n$
2010±25	ANISOVICH	00J	SPEC
1940±50	BAI	00A	BES $J/\psi \rightarrow \gamma(\pi^+\pi^-\pi^+\pi^-)$
1980±22	² BARBERIS	00C	450 $pp \rightarrow pp4\pi$
1940±22	³ BARBERIS	00C	450 $pp \rightarrow pp2\pi2\pi^0$
1980±50	ANISOVICH	99B	SPEC 1.35–1.94 $p\bar{p} \rightarrow \eta\eta\pi^0$
1960±30	BARBERIS	97B	OMEG 450 $pp \rightarrow pp2(\pi^+\pi^-)$
1918±12	ANTINORI	95	OMEG 300,450 $pp \rightarrow pp2(\pi^+\pi^-)$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●			
2038 ⁺¹³⁺¹² -11-73	⁴ UEHARA	09	BELL 10.6 $e^+e^- \rightarrow e^+e^-\pi^0\pi^0$
1980± 2±14	ABE	04	BELL 10.6 $e^+e^- \rightarrow e^+e^-K^+K^-$
1867±46	⁵ AMSLER	02	CBAR 0.9 $\bar{p}p \rightarrow \pi^0\eta\eta, \pi^0\pi^0\pi^0$
~ 1990	⁶ OAKDEN	94	RVUE 0.36–1.55 $\bar{p}p \rightarrow \pi\pi$
1950±15	⁷ ASTON	91	LASS 11 $K^-p \rightarrow \Lambda K\bar{K}\pi\pi$

¹ First solution, PWA is ambiguous.² Decaying into $\pi^+\pi^-2\pi^0$.³ Decaying into $2(\pi^+\pi^-)$.⁴ Taking into account $f_4(2050)$.⁵ T-matrix pole.⁶ From solution B of amplitude analysis of data on $\bar{p}p \rightarrow \pi\pi$. See however KLOET 96 who fit $\pi^+\pi^-$ only and find waves only up to $J = 3$ to be important but not significantly resonant.⁷ Cannot determine spin to be 2.



$f_2(1950)$ WIDTH

VALUE (MeV)	DOCUMENT ID	TECN	COMMENT
472 ± 18 OUR AVERAGE			
450 ± 50	⁸ BINON	05 GAMS	33 $\pi^- p \rightarrow \eta\eta n$
495 ± 35	ANISOVICH	00J SPEC	
380 ⁺¹²⁰ ₋₉₀	BAI	00A BES	$J/\psi \rightarrow \gamma(\pi^+ \pi^- \pi^+ \pi^-)$
520 ± 50	⁹ BARBERIS	00C	450 $pp \rightarrow pp4\pi$
485 ± 55	¹⁰ BARBERIS	00C	450 $pp \rightarrow pp4\pi$
500 ± 100	ANISOVICH	99B SPEC	1.35–1.94 $p\bar{p} \rightarrow \eta\eta\pi^0$
460 ± 40	BARBERIS	97B OMEG	450 $pp \rightarrow pp2(\pi^+ \pi^-)$
390 ± 60	ANTINORI	95 OMEG	300,450 $pp \rightarrow pp2(\pi^+ \pi^-)$

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

441 ⁺²⁷ ₋₂₅ ⁺²⁸ ₋₁₉₂	¹¹ UEHARA	09 BELL	10.6 $e^+ e^- \rightarrow e^+ e^- \pi^0 \pi^0$
297 ± 12 ± 6	ABE	04 BELL	10.6 $e^+ e^- \rightarrow e^+ e^- K^+ K^-$
385 ± 58	¹² AMSLER	02 CBAR	0.9 $\bar{p}p \rightarrow \pi^0 \eta\eta, \pi^0 \pi^0 \pi^0$
~ 100	¹³ OAKDEN	94 RVUE	0.36–1.55 $\bar{p}p \rightarrow \pi\pi$
250 ± 50	¹⁴ ASTON	91 LASS	11 $K^- p \rightarrow \Lambda K \bar{K} \pi\pi$

⁸ First solution, PWA is ambiguous.

⁹ Decaying into $\pi^+ \pi^- 2\pi^0$.

¹⁰ Decaying into $2(\pi^+ \pi^-)$.

¹¹ Taking into account $f_4(2050)$.

¹² T-matrix pole.

¹³ From solution B of amplitude analysis of data on $\bar{p}p \rightarrow \pi\pi$. See however KLOET 96 who fit $\pi^+\pi^-$ only and find waves only up to $J = 3$ to be important but not significantly resonant.

¹⁴ Cannot determine spin to be 2.

$f_2(1950)$ DECAY MODES

Mode	Fraction (Γ_i/Γ)
Γ_1 $K^*(892)\bar{K}^*(892)$	seen
Γ_2 $\pi\pi$	
Γ_3 $\pi^+\pi^-$	seen
Γ_4 $\pi^0\pi^0$	seen
Γ_5 4π	seen
Γ_6 $\pi^+\pi^-\pi^+\pi^-$	
Γ_7 $a_2(1320)\pi$	
Γ_8 $f_2(1270)\pi\pi$	
Γ_9 $\eta\eta$	seen
Γ_{10} $K\bar{K}$	seen
Γ_{11} $\gamma\gamma$	seen
Γ_{12} $\rho\bar{\rho}$	seen

$f_2(1950)$ $\Gamma(i)\Gamma(\gamma\gamma)/\Gamma(\text{total})$

$\Gamma(K\bar{K}) \times \Gamma(\gamma\gamma)/\Gamma_{\text{total}}$	$\Gamma_{10}\Gamma_{11}/\Gamma$		
VALUE (eV)	DOCUMENT ID	TECN	COMMENT

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

$122 \pm 4 \pm 26$ ¹⁵ ABE 04 BELL $10.6 e^+e^- \rightarrow e^+e^-K^+K^-$

¹⁵ Assuming spin 2.

$\Gamma(\pi\pi) \times \Gamma(\gamma\gamma)/\Gamma_{\text{total}}$	$\Gamma_2\Gamma_{11}/\Gamma$		
VALUE	DOCUMENT ID	TECN	COMMENT

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

$162^{+69+1137}_{-42-204}$ ¹⁶ UEHARA 09 BELL $10.6 e^+e^- \rightarrow e^+e^-\pi^0\pi^0$

¹⁶ Taking into account $f_4(2050)$.

$f_2(1950)$ BRANCHING RATIOS

$\Gamma(K^*(892)\bar{K}^*(892))/\Gamma_{\text{total}}$	Γ_1/Γ			
VALUE	DOCUMENT ID	TECN	CHG	COMMENT
seen	ASTON	91	LASS	0 11 $K^-p \rightarrow \Lambda K\bar{K}\pi\pi$

$\Gamma(a_2(1320)\pi)/\Gamma_{\text{total}}$ Γ_7/Γ

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
• • • We do not use the following data for averages, fits, limits, etc. • • •			
not seen	BARBERIS	00B	450 $pp \rightarrow p_f \eta \pi^+ \pi^- p_S$
not seen	BARBERIS	00C	450 $pp \rightarrow p_f 4\pi p_S$
possibly seen	BARBERIS	97B OMEG	450 $pp \rightarrow p p 2(\pi^+ \pi^-)$

$\Gamma(\eta\eta)/\Gamma(4\pi)$ Γ_9/Γ_5

<u>VALUE</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>COMMENT</u>
• • • We do not use the following data for averages, fits, limits, etc. • • •			
$< 5.0 \times 10^{-3}$	90	BARBERIS	00E 450 $pp \rightarrow p_f \eta \eta p_S$

$\Gamma(\eta\eta)/\Gamma(\pi^+ \pi^-)$ Γ_9/Γ_3

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
0.14 ± 0.05	AMSLER	02 CBAR	0.9 $\bar{p}p \rightarrow \pi^0 \eta \eta, \pi^0 \pi^0 \pi^0$

$\Gamma(p\bar{p})/\Gamma_{\text{total}}$ Γ_{12}/Γ

<u>VALUE</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
seen	111	ALEXANDER	10 CLEO	$\psi(2S) \rightarrow \gamma p \bar{p}$

$f_2(1950)$ REFERENCES

ALEXANDER	10	PR D82 092002	J.P. Alexander <i>et al.</i>	(CLEO Collab.)
UEHARA	09	PR D79 052009	S. Uehara <i>et al.</i>	(BELLE Collab.)
BINON	05	PAN 68 960	F. Binon <i>et al.</i>	
		Translated from YAF 68 998.		
ABE	04	EPJ C32 323	K. Abe <i>et al.</i>	(BELLE Collab.)
AMSLER	02	EPJ C23 29	C. Amsler <i>et al.</i>	
ANISOVICH	00J	PL B491 47	A.V. Anisovich <i>et al.</i>	
BAI	00A	PL B472 207	J.Z. Bai <i>et al.</i>	(BES Collab.)
BARBERIS	00B	PL B471 435	D. Barberis <i>et al.</i>	(WA 102 Collab.)
BARBERIS	00C	PL B471 440	D. Barberis <i>et al.</i>	(WA 102 Collab.)
BARBERIS	00E	PL B479 59	D. Barberis <i>et al.</i>	(WA 102 Collab.)
ANISOVICH	99B	PL B449 154	A.V. Anisovich <i>et al.</i>	
BARBERIS	97B	PL B413 217	D. Barberis <i>et al.</i>	(WA 102 Collab.)
KLOET	96	PR D53 6120	W.M. Kloet, F. Myhrer	(RUTG, NORD)
ANTINORI	95	PL B353 589	F. Antinori <i>et al.</i>	(ATHU, BARI, BIRM+) JP
OAKDEN	94	NP A574 731	M.N. Oakden, M.R. Pennington	(DURH)
ASTON	91	NPBPS B21 5	D. Aston <i>et al.</i>	(LASS Collab.)