

$f_4(2300)$

$$I^G(J^{PC}) = 0^+(4^{++})$$

OMITTED FROM SUMMARY TABLE

This entry was previously called $U_0(2350)$. Contains results mostly from formation experiments. For further production experiments see the Further States entry. See also $\rho(2150)$, $f_2(2150)$, $\rho_3(2250)$, $\rho_5(2350)$.

 $f_4(2300)$ MASS **$\bar{p}p \rightarrow \pi\pi$ or $\bar{K}K$**

VALUE (MeV)	DOCUMENT ID	TECN	COMMENT
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●			
~ 2314	HASAN	94	RVUE $\bar{p}p \rightarrow \pi\pi$
~ 2300	¹ MARTIN	80B	RVUE
~ 2300	¹ MARTIN	80C	RVUE
~ 2340	² CARTER	78B	CNTR $0.7-2.4 \bar{p}p \rightarrow K^- K^+$
~ 2330	DULUDE	78B	OSPK $1-2 \bar{p}p \rightarrow \pi^0 \pi^0$
~ 2310	³ CARTER	77	CNTR $0.7-2.4 \bar{p}p \rightarrow \pi\pi$
¹ $I(J^P) = 0(4^+)$ from simultaneous analysis of $p\bar{p} \rightarrow \pi^- \pi^+$ and $\pi^0 \pi^0$.			
² $I(J^P) = 0(4^+)$ from Barrelet-zero analysis.			
³ $I(J^P) = 0(4^+)$ from amplitude analysis.			

S-CHANNEL $\bar{p}p$ or $\bar{N}N$

VALUE (MeV)	DOCUMENT ID	TECN	COMMENT
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●			
2283 ± 17	⁴ ANISOVICH	00J	SPEC
~ 2380	⁵ CUTTS	78B	CNTR $0.97-3 \bar{p}p \rightarrow \bar{N}N$
2345 ± 15	^{5,6} COUPLAND	77	CNTR $0.7-2.4 \bar{p}p \rightarrow \bar{p}p$
2359 ± 2	^{5,7} ALSPECTOR	73	CNTR $\bar{p}p$ S channel
2375 ± 10	ABRAMS	70	CNTR S channel $\bar{N}N$
⁴ From the combined analysis of ANISOVICH 99C and ANISOVICH 99F on $\bar{p}p \rightarrow \eta\pi^0\pi^0$, $\pi^0\pi^0$, $\eta\eta$, $\eta\eta'$, $\pi^+\pi^-$.			
⁵ Isospins 0 and 1 not separated.			
⁶ From a fit to the total elastic cross section.			
⁷ Referred to as U or U region by ALSPECTOR 73.			

 $\pi^- p \rightarrow \eta\pi\pi n$

VALUE (MeV)	DOCUMENT ID	TECN	COMMENT
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●			
$2330 \pm 20 \pm 40$	AMELIN	00	VES $37 \pi^- p \rightarrow \eta\pi^+\pi^- n$

$p\bar{p}$ CENTRAL PRODUCTION

VALUE (MeV)	DOCUMENT ID	COMMENT
2320 ± 60 OUR ESTIMATE		
• • • We do not use the following data for averages, fits, limits, etc. • • •		
2332 ± 15	BARBERIS 00F	450 $p\bar{p} \rightarrow p_f \omega \omega p_S$

 $f_4(2300)$ WIDTH **$\bar{p}p \rightarrow \pi\pi$ or $\bar{K}K$**

VALUE (MeV)	DOCUMENT ID	TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •			
~ 278	HASAN 94	RVUE	$\bar{p}p \rightarrow \pi\pi$
~ 200	⁸ MARTIN 80C	RVUE	
~ 150	⁹ CARTER 78B	CNTR	0.7–2.4 $\bar{p}p \rightarrow K^- K^+$
~ 210	¹⁰ CARTER 77	CNTR	0.7–2.4 $\bar{p}p \rightarrow \pi\pi$
⁸ $I(J^P) = 0(4^+)$ from simultaneous analysis of $p\bar{p} \rightarrow \pi^- \pi^+$ and $\pi^0 \pi^0$.			
⁹ $I(J^P) = 0(4^+)$ from Barrelet-zero analysis.			
¹⁰ $I(J^P) = 0(4^+)$ from amplitude analysis.			

S-CHANNEL $\bar{p}p$ or $\bar{N}N$

VALUE (MeV)	DOCUMENT ID	TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •			
310 ± 25	¹¹ ANISOVICH 00J	SPEC	
135^{+150}_{-65}	^{12,13} COUPLAND 77	CNTR	0.7–2.4 $\bar{p}p \rightarrow \bar{p}p$
165^{+18}_{-8}	¹³ ALSPECTOR 73	CNTR	$\bar{p}p$ S channel
~ 190	ABRAMS 70	CNTR	S channel $\bar{N}N$
¹¹ From the combined analysis of ANISOVICH 99C and ANISOVICH 99F on $\bar{p}p \rightarrow \eta \pi^0 \pi^0$, $\pi^0 \pi^0$, $\eta\eta$, $\eta\eta'$, $\pi^+ \pi^-$.			
¹² From a fit to the total elastic cross section.			
¹³ Isospins 0 and 1 not separated.			

 $\pi^- p \rightarrow \eta\pi\pi n$

VALUE (MeV)	DOCUMENT ID	TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •			
$235 \pm 50 \pm 40$	AMELIN 00	VES	37 $\pi^- p \rightarrow \eta \pi^+ \pi^- n$

 $p\bar{p}$ CENTRAL PRODUCTION

VALUE (MeV)	DOCUMENT ID	COMMENT
250 ± 80 OUR ESTIMATE		
• • • We do not use the following data for averages, fits, limits, etc. • • •		
260 ± 57	BARBERIS 00F	450 $p\bar{p} \rightarrow p_f \omega \omega p_S$

$f_4(2300)$ DECAY MODES

Mode	Fraction (Γ_i/Γ)
Γ_1 $\rho\rho$	seen
Γ_2 $\omega\omega$	seen
Γ_3 $\eta\pi\pi$	seen
Γ_4 $\pi\pi$	seen
Γ_5 $K\bar{K}$	seen
Γ_6 $N\bar{N}$	seen

$f_4(2300)$ BRANCHING RATIOS

$\Gamma(\rho\rho)/\Gamma(\omega\omega)$	Γ_1/Γ_2
VALUE	DOCUMENT ID COMMENT
2.8 ± 0.5	BARBERIS 00F 450 $pp \rightarrow p_f \omega \omega p_s$

$f_4(2300)$ REFERENCES

AMELIN 00 NP A668 83	D. Amelin <i>et al.</i>	(VES Collab.)
ANISOVICH 00J PL B491 47	A.V. Anisovich <i>et al.</i>	
BARBERIS 00F PL B484 198	D. Barberis <i>et al.</i>	(WA 102 Collab.)
ANISOVICH 99C PL B452 173	A.V. Anisovich <i>et al.</i>	
ANISOVICH 99F NP A651 253	A.V. Anisovich <i>et al.</i>	
HASAN 94 PL B334 215	A. Hasan, D.V. Bugg	(LOQM)
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
CARTER 78B NP B141 467	A.A. Carter	(LOQM)
CUTTS 78B PR D17 16	D. Cutts <i>et al.</i>	(STON, WISC)
DULUDE 78B PL 79B 335	R.S. Dulude <i>et al.</i>	(BROW, MIT, BARI) JP
CARTER 77 PL 67B 117	A.A. Carter <i>et al.</i>	(LOQM, RHEL) JP
COUPLAND 77 PL 71B 460	M. Coupland <i>et al.</i>	(LOQM, RHEL)
ALSPECTOR 73 PRL 30 511	J. Alspector <i>et al.</i>	(RUTG, UPNJ)
ABRAMS 70 PR D1 1917	R.J. Abrams <i>et al.</i>	(BNL)