

$f_4(2300)$

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

NODE=M041

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 $\rho(2150)$, $f_2(2150)$, $\rho_3(2250)$, $\rho_5(2350)$.

NODE=M041

 $f_4(2300)$ MASS

NODE=M041205

 $\bar{p}p \rightarrow \pi\pi$ 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 $\bar{p}p \rightarrow \pi\pi$

NODE=M041M1
NODE=M041M1

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.

NODE=M041M1;LINKAGE=P
NODE=M041M1;LINKAGE=K
NODE=M041M1;LINKAGE=J**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.

NODE=M041M2;LINKAGE=AN

NODE=M041M2;LINKAGE=I
NODE=M041M2;LINKAGE=E
NODE=M041M2;LINKAGE=M **$\pi^- p \rightarrow \eta \pi \pi n$**

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

NODE=M041M3
NODE=M041M3 **pp CENTRAL PRODUCTION**

VALUE (MeV)	DOCUMENT ID	COMMENT
2320 ± 60 OUR ESTIMATE		

NODE=M041M4
NODE=M041M4

→ UNCHECKED ←

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

2332 ± 15 BARBERIS 00F 450 $pp \rightarrow p f \omega \omega p_S$

 $f_4(2300)$ WIDTH

NODE=M041210

 $\bar{p}p \rightarrow \pi\pi$ 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 $\bar{p}p \rightarrow \pi\pi$

NODE=M041W1
NODE=M041W1

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.

NODE=M041W1;LINKAGE=P
NODE=M041W1;LINKAGE=K
NODE=M041W1;LINKAGE=J

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 $0.7\text{--}2.4 \bar{p}p \rightarrow \bar{p}p$
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.			

NODE=M041W2
 NODE=M041W2

NODE=M041W2;LINKAGE=AN

NODE=M041W2;LINKAGE=E
 NODE=M041W2;LINKAGE=I

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

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 $37 \pi^-p \rightarrow \eta\pi^+\pi^-n$

NODE=M041W3
 NODE=M041W3

 pp CENTRAL PRODUCTION

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

NODE=M041W4
 NODE=M041W4
 $\rightarrow$ UNCHECKED $\leftarrow$

 $f_4(2300)$ 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

NODE=M041215;NODE=M041

DESIG=1;OUR EST; $\rightarrow$ UNCHECKED $\leftarrow$
 DESIG=2;OUR EST; $\rightarrow$ UNCHECKED $\leftarrow$
 DESIG=3;OUR EST; $\rightarrow$ UNCHECKED $\leftarrow$
 DESIG=4;OUR EST; $\rightarrow$ UNCHECKED $\leftarrow$
 DESIG=5;OUR EST; $\rightarrow$ UNCHECKED $\leftarrow$
 DESIG=6;OUR EST; $\rightarrow$ UNCHECKED $\leftarrow$

 $f_4(2300)$ BRANCHING RATIOS

$\Gamma(\rho\rho)/\Gamma(\omega\omega)$	DOCUMENT ID	COMMENT	Γ_1/Γ_2
• • • We do not use the following data for averages, fits, limits, etc. • • •			
2.8 ± 0.5	BARBERIS	00F 450 $pp \rightarrow p_f\omega\omega p_s$	

NODE=M041220

NODE=M041R1
 NODE=M041R1

 $f_4(2300)$ 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>	(RAL, LOQM, PNPI+)
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)

NODE=M041

REFID=47432
 REFID=47950
 REFID=47962
 REFID=46903
 REFID=46926
 REFID=44103
 REFID=21838
 REFID=21837
 REFID=21964
 REFID=21733
 REFID=21850
 REFID=21963
 REFID=21830
 REFID=21813
 REFID=21807