

**$f_4(2300)$** 

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

## 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	<sup>1</sup> MARTIN	80B	RVUE
~ 2300	<sup>1</sup> MARTIN	80C	RVUE
~ 2340	<sup>2</sup> 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	<sup>3</sup> CARTER	77	CNTR $0.7-2.4 \bar{p}p \rightarrow \pi\pi$

<sup>1</sup>  $I(J^P) = 0(4^+)$  from simultaneous analysis of  $p\bar{p} \rightarrow \pi^- \pi^+$  and  $\pi^0 \pi^0$ .

<sup>2</sup>  $I(J^P) = 0(4^+)$  from Barrelet-zero analysis.

<sup>3</sup>  $I(J^P) = 0(4^+)$  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. • • •		
$2283 \pm 17$	<sup>4</sup> ANISOVICH	00J	SPEC
~ 2380	<sup>5</sup> CUTTS	78B	CNTR $0.97-3 \bar{p}p \rightarrow \bar{N}N$
$2345 \pm 15$	<sup>5,6</sup> COUPLAND	77	CNTR $0.7-2.4 \bar{p}p \rightarrow \bar{p}p$
$2359 \pm 2$	<sup>5,7</sup> ALSPECTOR	73	CNTR $\bar{p}p$ S channel
$2375 \pm 10$	ABRAMS	70	CNTR S channel $\bar{N}N$

<sup>4</sup> From the combined analysis of ANISOVICH 99C and ANISOVICH 99F on  $\bar{p}p \rightarrow \eta\pi^0\pi^0$ ,  $\pi^0\pi^0$ ,  $\eta\eta$ ,  $\eta\eta'$ ,  $\pi^+\pi^-$ .

<sup>5</sup> Isospins 0 and 1 not separated.

<sup>6</sup> From a fit to the total elastic cross section.

<sup>7</sup> 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	TECN	COMMENT
<b>2320±60 OUR ESTIMATE</b>			
• • • 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	<sup>8</sup> MARTIN	80C	RVUE
~ 150	<sup>9</sup> CARTER	78B	CNTR 0.7–2.4 $\bar{p}p \rightarrow K^- K^+$
~ 210	<sup>10</sup> CARTER	77	CNTR 0.7–2.4 $\bar{p}p \rightarrow \pi\pi$
<sup>8</sup> $I(J^P) = 0(4^+)$ from simultaneous analysis of $p\bar{p} \rightarrow \pi^- \pi^+$ and $\pi^0 \pi^0$ .			
<sup>9</sup> $I(J^P) = 0(4^+)$ from Barrelet-zero analysis.			
<sup>10</sup> $I(J^P) = 0(4^+)$ 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	<sup>11</sup> ANISOVICH	00J	SPEC
135 <sup>+150</sup> <sub>-65</sub>	<sup>12,13</sup> COUPLAND	77	CNTR 0.7–2.4 $\bar{p}p \rightarrow \bar{p}p$
165 <sup>+18</sup> <sub>-8</sub>	<sup>13</sup> ALSPECTOR	73	CNTR $\bar{p}p$ S channel
~ 190	ABRAMS	70	CNTR S channel $\bar{N}N$
<sup>11</sup> From the combined analysis of ANISOVICH 99C and ANISOVICH 99F on $\bar{p}p \rightarrow \eta \pi^0 \pi^0$ , $\pi^0 \pi^0$ , $\eta\eta$ , $\eta\eta'$ , $\pi^+ \pi^-$ .			
<sup>12</sup> From a fit to the total elastic cross section.			
<sup>13</sup> 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±50±40	AMELIN	00	VES 37 $\pi^- p \rightarrow \eta \pi^+ \pi^- n$

 **$p\bar{p}$  CENTRAL PRODUCTION**

VALUE (MeV)	DOCUMENT ID	COMMENT
<b>250±80 OUR ESTIMATE</b>		
• • • 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 ( $\Gamma_i/\Gamma$ )
$\Gamma_1$ $\rho\rho$	seen
$\Gamma_2$ $\omega\omega$	seen
$\Gamma_3$ $\eta\pi\pi$	seen
$\Gamma_4$ $\pi\pi$	seen
$\Gamma_5$ $K\bar{K}$	seen
$\Gamma_6$ $N\bar{N}$	seen

### $f_4(2300)$ BRANCHING RATIOS

$\Gamma(\rho\rho)/\Gamma(\omega\omega)$	DOCUMENT ID	COMMENT	$\Gamma_1/\Gamma_2$
VALUE			
$2.8 \pm 0.5$	BARBERIS 00F	450 $p\rho \rightarrow p_f\omega\omega p_s$	

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

### $f_4(2300)$ 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
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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)