LONGACRE 90 argues that this particle is inconsistent with a QCD arrangement of quarks and gluons. He then develops a final-state rescattering mechanism with successive interactions between a K, a $\overline{K}$, and a π. The $f_1(1420)$ would then be a molecular state formed by the π orbiting in a P wave around an S-wave $K\overline{K}$ state.

$f_1(1420)$ MASS

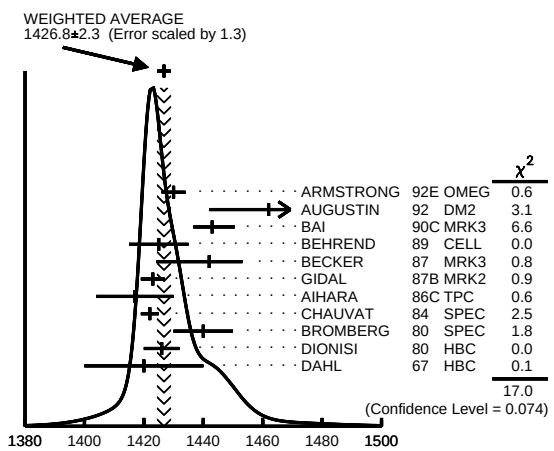
PRODUCED IN $p\overline{p}$ ANNIHILATION

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	COMMENT
1414.9± 3.5 OUR AVERAGE		Error includes scale factor of 1.2.			
1417.5± 4		NACASCH	78	HBC	0.7,0.76 $\overline{p}p$
1398 ±10	170	DEFOIX	72	HBC	0.7 $\overline{p}p \rightarrow 7\pi$
1406 ± 7	280	DUBOC	72	HBC	1.2 $\overline{p}p \rightarrow 2K4\pi$
1420 ± 7	310	LORSTAD	69	HBC	0.7 $\overline{p}p$
1423.0±10.0		FRENCH	67	HBC	3–4 $\overline{p}p$

PRODUCED IN OTHER REACTIONS

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	COMMENT
1426.8± 2.3 OUR AVERAGE		Error includes scale factor of 1.3. See the ideogram below.			
1430 ± 4		[1] ARMSTRONG	92E	OMEG	85,300 $\pi^+ p$, $pp \rightarrow \pi^+ p$, $pp(K\overline{K}\pi)$
1462 ±20		[2] AUGUSTIN	92	DM2	$J/\psi \rightarrow \gamma K\overline{K}\pi$
1443 $^{+\ 7}_{-\ 6}$ $^{+\ 3}_{-\ 2}$	1100	BAI	90C	MRK3	$J/\psi \rightarrow \gamma K^0_S K^\pm \pi^\mp$
1425 ±10	17	BEHREND	89	CELL	$\gamma\gamma \rightarrow K^0_S K^\pm \pi^\mp$
1442 ± 5.0 $^{+10.0}_{-17.0}$	111 $^{+31}_{-26}$	BECKER	87	MRK3	e^+e^-, $\omega K\overline{K}\pi$
1423 ± 4		GIDAL	87B	MRK2	$e^+e^- \rightarrow e^+e^- K\overline{K}\pi$
1417.0±13.0	13	AIHARA	86C	TPC	$e^+e^- \rightarrow e^+e^- K\overline{K}\pi$
1422.0± 3.0		CHAUVAT	84	SPEC	ISR 31.5 pp
1440.0±10.0		[3] BROMBERG	80	SPEC	100 $\pi^- p \rightarrow K\overline{K}\pi X$
1426.0± 6.0	221	DIONISI	80	HBC	4 $\pi^- p \rightarrow K\overline{K}\pi n$
1420 ±20		DAHL	67	HBC	1.6–4.2 $\pi^- p$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
1429 ± 3	389± 27	ARMSTRONG	89	OMEG	300 $pp \rightarrow K\overline{K}\pi pp$
1425.0± 2.0	1520	ARMSTRONG	84	OMEG	85 $\pi^+ p$, $pp \rightarrow (\pi^+, p)(K\overline{K}\pi)p$

[1] This result supersedes ARMSTRONG 84, ARMSTRONG 89.
[2] From fit to the $K^*(892)K$ 1^{++} partial wave.
[3] Mass error increased to account for $a_0(980)$ mass cut uncertainties.



$f_1(1420)$ mass (MeV)

$f_1(1420)$ WIDTH

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	COMMENT
52 ± 4 OUR AVERAGE					
58 ±10		[4] ARMSTRONG	92E	OMEG	85,300 $\pi^+ p$, $pp \rightarrow \pi^+ p$, $pp(K\overline{K}\pi)$
129 ±41		[5] AUGUSTIN	92	DM2	$J/\psi \rightarrow \gamma K\overline{K}\pi$
68 $^{+29}_{-18}$ $^{+8}_{-9}$	1100	BAI	90C	MRK3	$J/\psi \rightarrow \gamma K^0_S K^\pm \pi^\mp$
42 ±22	17	BEHREND	89	CELL	$\gamma\gamma \rightarrow K^0_S K^\pm \pi^\mp$
40 $^{+17}_{-13}$ ±5	111 $^{+31}_{-26}$	BECKER	87	MRK3	$e^+e^- \rightarrow \omega K\overline{K}\pi$
35.0 $^{+47.0}_{-20.0}$	13	AIHARA	86C	TPC	$e^+e^- \rightarrow e^+e^- K\overline{K}\pi$
47.0±10.0		CHAUVAT	84	SPEC	ISR 31.5 pp
62.0±14.0		BROMBERG	80	SPEC	100 $\pi^- p \rightarrow K\overline{K}\pi X$
40.0±15.0	221	DIONISI	80	HBC	4 $\pi^- p \rightarrow K\overline{K}\pi n$
53 ±20.0		NACASCH	78	HBC	0.7,0.76 $\overline{p}p$
50 ±10	170	DEFOIX	72	HBC	0.7 $\overline{p}p \rightarrow 7\pi$
50 ±12	280	DUBOC	72	HBC	1.2 $\overline{p}p \rightarrow 2K4\pi$
60 ±20	310	LORSTAD	69	HBC	0.7 $\overline{p}p$
60.0±20.0		DAHL	67	HBC	1.6–4.2 $\pi^- p$
45 ±20		FRENCH	67	HBC	3–4 $\overline{p}p$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
58 ± 8	389± 27	ARMSTRONG	89	OMEG	300 $pp \rightarrow K\overline{K}\pi pp$
62.0± 5.0	1520	ARMSTRONG	84	OMEG	85 $\pi^+ p$, $pp \rightarrow (\pi^+, p)(K\overline{K}\pi)p$

[4] This result supersedes ARMSTRONG 84, ARMSTRONG 89.
[5] From fit to the $K^*(892)K$ 1^{++} partial wave.

$f_1(1420)$ DECAY MODES

	Mode	Fraction (Γ_i/Γ)
Γ_1	$K\overline{K}\pi$	dominant
Γ_2	$\eta\pi\pi$	possibly seen
Γ_3	$a_0(980)\pi$	
Γ_4	$\pi\pi\rho$	
Γ_5	$K\overline{K}^*(892)+$ c.c.	
Γ_6	4π	
Γ_7	$\gamma\gamma^*$	
Γ_8	$\rho^0\gamma$	

$f_1(1420)$ $\Gamma(i)\Gamma(\gamma\gamma)/\Gamma(\text{total})$

$\Gamma(K\overline{K}\pi) \times \Gamma(\gamma\gamma^*)/\Gamma_{\text{total}}$ $\Gamma_1\Gamma_7/\Gamma$

VALUE (keV)	CL%	DOCUMENT ID		TECN	COMMENT
1.7±0.4 OUR AVERAGE					
3.0±0.9±0.7		[6,7] BEHREND	89	CELL	$e^+e^- \rightarrow e^+e^- K^0_S K\pi$
2.3 $^{+1.0}_{-0.9}$ ±0.8		HILL	89	JADE	$e^+e^- \rightarrow e^+e^- K^\pm K^0_S \pi^\mp$
1.3±0.5±0.3		AIHARA	88B	TPC	$e^+e^- \rightarrow e^+e^- K^\pm K^0_S \pi^\mp$
1.6±0.7±0.3		[6,8] GIDAL	87B	MRK2	$e^+e^- \rightarrow e^+e^- K\overline{K}\pi$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<8.0	95	JENNI	83	MRK2	$e^+e^- \rightarrow e^+e^- K\overline{K}\pi$

[6] Assume a ρ-pole form factor.
[7] A ϕ - pole form factor gives considerably smaller widths.
[8] Published value divided by 2.

$f_1(1420)$ BRANCHING RATIOS

$\Gamma(K\overline{K}^*(892)+\text{c.c.})/\Gamma(K\overline{K}\pi)$ Γ_5/Γ_1

VALUE	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.76±0.06	BROMBERG	80	SPEC	100 $\pi^- p \rightarrow K\overline{K}\pi X$
0.86±0.12	DIONISI	80	HBC	4 $\pi^- p \rightarrow K\overline{K}\pi n$

$\Gamma(\pi\pi\rho)/\Gamma(K\overline{K}\pi)$ Γ_4/Γ_1

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<0.3	95	CORDEN	78	OMEG	12–15 $\pi^- p$
<2.0		DAHL	67	HBC	1.6–4.2 $\pi^- p$

$\Gamma(\eta\pi\pi)/\Gamma(K\overline{K}\pi)$ Γ_2/Γ_1

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.1	95	ARMSTRONG	91B	OMEG	300 $pp \rightarrow pp\eta\pi^+\pi^-$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
1.35±0.75		KOPKE	89	MRK3	$J/\psi \rightarrow \omega\eta\pi\pi(K\overline{K}\pi)$
<0.6	90	GIDAL	87	MRK2	$e^+e^- \rightarrow e^+e^-\eta\pi^+\pi^-$
<0.5	95	CORDEN	78	OMEG	12–15 $\pi^- p$
1.5 ±0.8		DEFOIX	72	HBC	0.7 $\overline{p}p$

$\Gamma(a_0(980)\pi)/\Gamma(\eta\pi\pi)$ Γ_3/Γ_2

VALUE	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
not seen in either mode	ANDO	86	SPEC	8 $\pi^- p$
not seen in either mode	CORDEN	78	OMEG	12–15 $\pi^- p$
0.4±0.2	DEFOIX	72	HBC	0.7 $\overline{p}p \rightarrow 7\pi$

$\Gamma(4\pi)/\Gamma(K\overline{K}^*(892)+\text{c.c.})$ Γ_6/Γ_5

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<0.90	95	DIONISI	80	HBC	4 $\pi^- p$