$\phi(2170)$

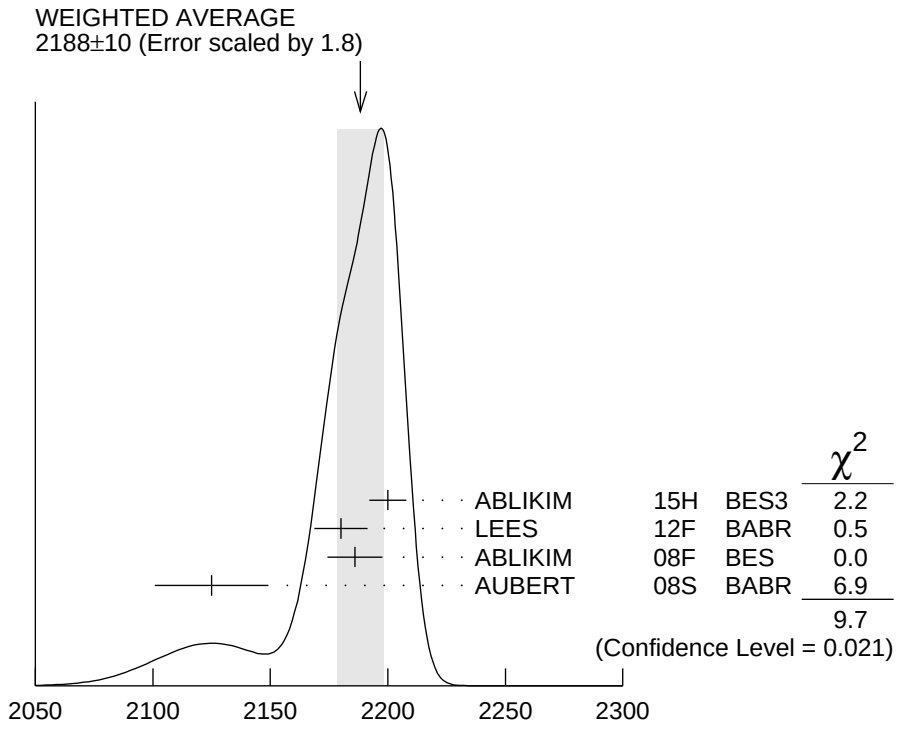
$I^G(J^{PC}) = 0^-(1^{--})$

Observed by AUBERT,BE 06D in the initial-state radiation process $e^+e^- \to \phi f_0(980)\gamma$.

$\phi(2170)$ MASS

VALUE (MeV)	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
2188±10 OUR AVERAGE		Error includes scale factor of 1.8. See the ideogram below.			
2200± 6± 5	471	ABLIKIM	15H	BES3	$J/\psi \to \eta\phi\pi^+\pi^-$
2180± 8± 8	[1,2]	LEES	12F	BABR	10.6 $e^+e^- \to \phi\pi^+\pi^-\gamma$
2186±10± 6	52	ABLIKIM	08F	BES	$J/\psi \to \eta\phi f_0(980)$
2125±22±10	483	AUBERT	08S	BABR	10.6 $e^+e^- \to \phi\eta\gamma$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$2079\pm13^{+79}_{-28}$	4.8k	[3] SHEN	09	BELL	10.6 $e^+e^- \to K^+K^-\pi^+\pi^-\gamma$
2192±14	116	[4] AUBERT	07AK	BABR	10.6 $e^+e^- \to K^+K^-\pi^+\pi^-\gamma$
2169±20	149	[4] AUBERT	07AK	BABR	10.6 $e^+e^- \to K^+K^-\pi^0\pi^0\gamma$
2175±10±15	201	[2,5] AUBERT,BE	06D	BABR	10.6 $e^+e^- \to K^+K^-\pi\pi\gamma$

[1] Fit includes interference with the $\phi(1680)$.
[2] From the $\phi f_0(980)$ component.
[3] From a fit with two incoherent Breit-Wigners.
[4] From the $K^+K^-f_0(980)$ component.
[5] Superseded by LEES 12F.



$\phi(2170)$ WIDTH

VALUE (MeV)	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
83±12 OUR AVERAGE					
104±15±15	471	ABLIKIM	15H	BES3	$J/\psi \to \eta\phi\pi^+\pi^-$
77±15±10	[6,7]	LEES	12F	BABR	10.6 $e^+e^- \to \phi\pi^+\pi^-\gamma$
65±23±17	52	ABLIKIM	08F	BES	$J/\psi \to \eta\phi f_0(980)$
61±50±13	483	AUBERT	08S	BABR	10.6 $e^+e^- \to \phi\eta\gamma$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$192\pm23^{+25}_{-61}$	4.8k	[8] SHEN	09	BELL	10.6 $e^+e^- \to K^+K^-\pi^+\pi^-\gamma$
71±21	116	[9] AUBERT	07AK	BABR	10.6 $e^+e^- \to K^+K^-\pi^+\pi^-\gamma$
102±27	149	[9] AUBERT	07AK	BABR	10.6 $e^+e^- \to K^+K^-\pi^0\pi^0\gamma$
58±16±20	201	[7,10] AUBERT,BE	06D	BABR	10.6 $e^+e^- \to K^+K^-\pi\pi\gamma$

[6] Fit includes interference with the $\phi(1680)$.
[7] From the $\phi f_0(980)$ component.
[8] From a fit with two incoherent Breit-Wigners.
[9] From the $K^+K^- f_0(980)$ component.
[10] Superseded by LEES 12F.

$\phi(2170)$ DECAY MODES

	Mode	Fraction (Γ_i/Γ)
Γ_1	e^+e^-	seen
Γ_2	$\phi\eta$	
Γ_3	$\phi\pi\pi$	
Γ_4	$\phi f_0(980)$	seen
Γ_5	$K^+K^-\pi^+\pi^-$	
Γ_6	$K^+K^- f_0(980) \to K^+K^-\pi^+\pi^-$	seen
Γ_7	$K^+K^-\pi^0\pi^0$	
Γ_8	$K^+K^- f_0(980) \to K^+K^-\pi^0\pi^0$	seen
Γ_9	$K^{*0}K^\pm\pi^\mp$	not seen
Γ_{10}	$K^*(892)^0\overline{K}^*(892)^0$	not seen

$\phi(2170)$ $\Gamma(i)\Gamma(e^+e^-)/\Gamma(\text{total})$

$\Gamma(\phi\eta) \times \Gamma(e^+e^-)/\Gamma_{\text{total}}$ $\Gamma_2\Gamma_1/\Gamma$

VALUE (eV)	*EVTS*	*DOCUMENT ID*	*TECN*	*COMMENT*
• • • We do not use the following data for averages, fits, limits, etc. • • •				
1.7±0.7±1.3	483	AUBERT	08S BABR	10.6 $e^+e^- \to \phi\eta\gamma$

$\Gamma(\phi f_0(980)) \times \Gamma(e^+e^-)/\Gamma_{\text{total}}$ $\Gamma_4\Gamma_1/\Gamma$

VALUE (eV)	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
2.3±0.3±0.3	[11,12]	LEES	12F	BABR	10.6 $e^+e^- \to \phi\pi^+\pi^-\gamma$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
2.5±0.8±0.4	201	[12,13] AUBERT,BE	06D	BABR	10.6 $e^+e^- \to K^+K^-\pi\pi\gamma$

[11] From a fit with constructive interference with the $\phi(1680)$. In a fit with destructive interference, the value is larger by a factor of 12.

[12] From the $\phi f_0(980)$ component.

[13] Superseded by LEES 12F.

$\phi(2170)$ $\Gamma(i)\Gamma(e^+e^-)/\Gamma^2(total)$

$\Gamma(\phi\pi\pi)/\Gamma_{total} \times \Gamma(e^+e^-)/\Gamma_{total}$ $\Gamma_3/\Gamma \times \Gamma_1/\Gamma$

VALUE (units 10^{-7})	EVTS	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$1.65 \pm 0.15 \pm 0.18$	4.8k	[14] SHEN	09	BELL	10.6 $e^+e^- \to K^+K^-\pi^+\pi^-\gamma$

[14] Multiplied by 3/2 to take into account the $\phi\pi^0\pi^0$ mode. Using $B(\phi \to K^+K^-) = (49.2 \pm 0.6)\%$.

$\phi(2170)$ BRANCHING RATIOS

$\Gamma(K^+K^- f_0(980) \to K^+K^-\pi^+\pi^-)/\Gamma_{total}$ Γ_6/Γ

VALUE	DOCUMENT ID		TECN	COMMENT
seen	AUBERT	07AK	BABR	10.6 $e^+e^- \to K^+K^-\pi^+\pi^-\gamma$

$\Gamma(K^+K^- f_0(980) \to K^+K^-\pi^0\pi^0)/\Gamma_{total}$ Γ_8/Γ

VALUE	DOCUMENT ID		TECN	COMMENT
seen	AUBERT	07AK	BABR	10.6 $e^+e^- \to K^+K^-\pi^0\pi^0\gamma$

$\Gamma(K^{*0}K^\pm\pi^\mp)/\Gamma_{total}$ Γ_9/Γ

VALUE	DOCUMENT ID		TECN	COMMENT
not seen	AUBERT	07AK	BABR	10.6 GeV e^+e^-

$\Gamma(K^*(892)^0\overline{K}^*(892)^0)/\Gamma_{total}$ Γ_{10}/Γ

VALUE	DOCUMENT ID		TECN	COMMENT
not seen	ABLIKIM	10C	BES2	$J/\psi \to \eta K^+\pi^-K^-\pi^+$

$\phi(2170)$ REFERENCES

ABLIKIM	15H	PR D91 052017	M. Ablikim *et al.*	(BES III Collab.)
LEES	12F	PR D86 012008	J.P. Lees *et al.*	(BABAR Collab.)
ABLIKIM	10C	PL B685 27	M. Ablikim *et al.*	(BES II Collab.)
SHEN	09	PR D80 031101	C.P. Shen *et al.*	(BELLE Collab.)
ABLIKIM	08F	PRL 100 102003	M. Ablikim *et al.*	(BES Collab.)
AUBERT	08S	PR D77 092002	B. Aubert *et al.*	(BABAR Collab.)
AUBERT	07AK	PR D76 012008	B. Aubert *et al.*	(BABAR Collab.)
AUBERT,BE	06D	PR D74 091103	B. Aubert *et al.*	(BABAR Collab.)