

$\phi(2170)$

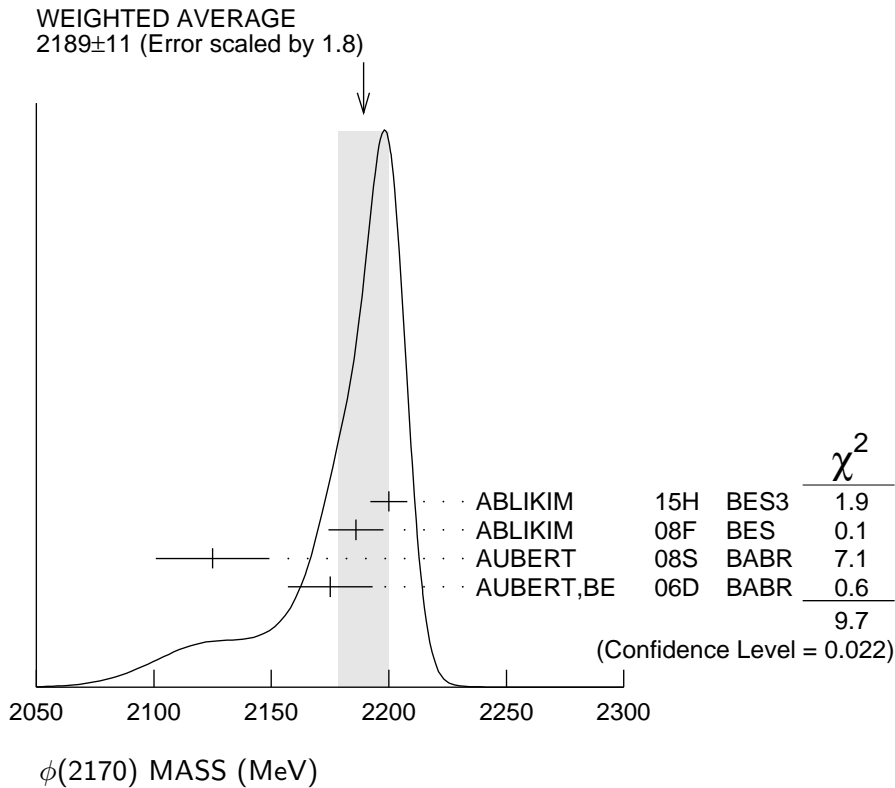
$$I^G(J^{PC}) = 0^-(1^{--})$$

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

$\phi(2170)$ MASS

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT
2189±11 OUR AVERAGE Error includes scale factor of 1.8. See the ideogram below.				
2200±6±5	471	ABLIKIM	15H BES3	$J/\psi \rightarrow \eta\phi\pi^+\pi^-$
2186±10±6	52	ABLIKIM	08F BES	$J/\psi \rightarrow \eta\phi f_0(980)$
2125±22±10	483	AUBERT	08S BABR	10.6 $e^+e^- \rightarrow \phi\eta\gamma$
2175±10±15	201	¹ AUBERT, BE	06D BABR	10.6 $e^+e^- \rightarrow K^+K^-\pi\pi\gamma$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●				
2079±13 ⁺⁷⁹ ₋₂₈	4.8k	² SHEN	09 BELL	10.6 $e^+e^- \rightarrow K^+K^-\pi^+\pi^-\gamma$
2192±14	116	³ AUBERT	07AK BABR	10.6 $e^+e^- \rightarrow K^+K^-\pi^+\pi^-\gamma$
2169±20	149	³ AUBERT	07AK BABR	10.6 $e^+e^- \rightarrow K^+K^-\pi^0\pi^0\gamma$

¹ From the $\phi f_0(980)$ component.
² From a fit with two incoherent Breit-Wigners.
³ From the $K^+K^-f_0(980)$ component.



$\phi(2170)$ WIDTH

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT
79±14 OUR AVERAGE				
104±15±15	471	ABLIKIM	15H BES3	$J/\psi \rightarrow \eta\phi\pi^+\pi^-$
65±23±17	52	ABLIKIM	08F BES	$J/\psi \rightarrow \eta\phi f_0(980)$
61±50±13	483	AUBERT	08S BABR	$10.6 e^+e^- \rightarrow \phi\eta\gamma$
58±16±20	201	⁴ AUBERT,BE	06D BABR	$10.6 e^+e^- \rightarrow K^+K^-\pi\pi\gamma$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●				
192±23 ⁺²⁵ ₋₆₁	4.8k	⁵ SHEN	09 BELL	$10.6 e^+e^- \rightarrow K^+K^-\pi^+\pi^-\gamma$
71±21	116	⁶ AUBERT	07AK BABR	$10.6 e^+e^- \rightarrow K^+K^-\pi^+\pi^-\gamma$
102±27	149	⁶ AUBERT	07AK BABR	$10.6 e^+e^- \rightarrow K^+K^-\pi^0\pi^0\gamma$

⁴ From the $\phi f_0(980)$ component.⁵ From a fit with two incoherent Breit-Wigners.⁶ From the $K^+K^-f_0(980)$ component. $\phi(2170)$ DECAY MODES

Mode	Fraction (Γ_i/Γ)
$\Gamma_1 e^+e^-$	seen
$\Gamma_2 \phi\eta$	
$\Gamma_3 \phi\pi\pi$	
$\Gamma_4 \phi f_0(980)$	seen
$\Gamma_5 K^+K^-\pi^+\pi^-$	
$\Gamma_6 K^+K^-f_0(980) \rightarrow K^+K^-\pi^+\pi^-$	seen
$\Gamma_7 K^+K^-\pi^0\pi^0$	
$\Gamma_8 K^+K^-f_0(980) \rightarrow K^+K^-\pi^0\pi^0$	seen
$\Gamma_9 K^{*0}K^\pm\pi^\mp$	not seen
$\Gamma_{10} K^*(892)^0\bar{K}^*(892)^0$	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	$10.6 e^+e^- \rightarrow \phi\eta\gamma$

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

VALUE (eV)	EVTS	DOCUMENT ID	TECN	COMMENT
2.5±0.8±0.4	201	⁷ AUBERT,BE	06D BABR	$10.6 e^+e^- \rightarrow K^+K^-\pi\pi\gamma$

⁷ From the $\phi f_0(980)$ component.

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

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

VALUE (units 10^{-7})	EVTS	DOCUMENT ID	TECN	COMMENT
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• • • We do not use the following data for averages, fits, limits, etc. • • •

1.65 ± 0.15 ± 0.18	4.8k	⁸ SHEN	09 BELL	10.6 $e^+e^- \rightarrow K^+K^-\pi^+\pi^-\gamma$
⁸ Multiplied by 3/2 to take into account the $\phi\pi^0\pi^0$ mode. Using $B(\phi \rightarrow K^+K^-) = (49.2 \pm 0.6)\%$.				

$\phi(2170)$ BRANCHING RATIOS

$$\Gamma(K^+K^-f_0(980) \rightarrow K^+K^-\pi^+\pi^-)/\Gamma_{\text{total}} \qquad \Gamma_6/\Gamma$$

VALUE	DOCUMENT ID	TECN	COMMENT
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seen	AUBERT	07AK BABR	10.6 $e^+e^- \rightarrow K^+K^-\pi^+\pi^-\gamma$
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$$\Gamma(K^+K^-f_0(980) \rightarrow K^+K^-\pi^0\pi^0)/\Gamma_{\text{total}} \qquad \Gamma_8/\Gamma$$

VALUE	DOCUMENT ID	TECN	COMMENT
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seen	AUBERT	07AK BABR	10.6 $e^+e^- \rightarrow K^+K^-\pi^0\pi^0\gamma$
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$$\Gamma(K^{*0}K^\pm\pi^\mp)/\Gamma_{\text{total}} \qquad \Gamma_9/\Gamma$$

VALUE	DOCUMENT ID	TECN	COMMENT
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not seen	AUBERT	07AK BABR	10.6 GeV e^+e^-
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$$\Gamma(K^*(892)^0\bar{K}^*(892)^0)/\Gamma_{\text{total}} \qquad \Gamma_{10}/\Gamma$$

VALUE	DOCUMENT ID	TECN	COMMENT
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not seen	ABLIKIM	10C BES2	$J/\psi \rightarrow \eta K^+\pi^-K^-\pi^+$
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$\phi(2170)$ REFERENCES

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