$\phi(1680)$

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

$\phi(1680)$ MASS

e^+e^- PRODUCTION

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	COMMENT
1680±20 OUR ESTIMATE					
1681± 8 OUR AVERAGE					
1700±20		[1] CLEGG	94	RVUE	$e^+e^- \rightarrow K^+K^-$, $K^0_S K\pi$
1657±27	367	BISELLO	91C	DM2	$e^+e^- \rightarrow K^0_S K^\pm \pi^\mp$
1680±10		[2] BUON	82	DM1	$e^+e^- \rightarrow$ hadrons
• • • We do not use the following data for averages, fits, limits, etc. • • •					
1655±17		[3] BISELLO	88B	DM2	$e^+e^- \rightarrow K^+K^-$
1677±12		[4] MANE	82	DM1	$e^+e^- \rightarrow K^0_S K\pi$

PHOTOPRODUCTION

VALUE (MeV)	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
1726±22	BUSENITZ	89	TPS	$\gamma p \rightarrow K^+K^-X$
1760±20	ATKINSON	85C	OMEG	20–70 $\gamma p \rightarrow K\overline{K}X$
1690±10	ASTON	81F	OMEG	25–70 $\gamma p \rightarrow K^+K^-X$

[1] Using BISELLO 88B and MANE 82 data.
[2] From global fit of ρ, ω, ϕ and their radial excitations to channels $\omega\pi^+\pi^-$, K^+K^-, $K^0_S K^0_L$, $K^0_S K^\pm\pi^\mp$. Assume mass 1570 MeV and width 510 MeV for ρ radial excitations, mass 1570 and width 500 MeV for ω radial excitation.
[3] From global fit including ρ, ω, ϕ and $\rho(1700)$ assume mass 1570 MeV and width 510 MeV for ρ radial excitation.
[4] Fit to one channel only, neglecting interference with ω, $\rho(1700)$.

$\phi(1680)$ WIDTH

e^+e^- PRODUCTION

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	COMMENT
150±50 OUR ESTIMATE This is only an educated guess; the error given is larger than the error on the average of the published values.					
• • • We do not use the following data for averages, fits, limits, etc. • • •					
300±60		[5] CLEGG	94	RVUE	$e^+e^- \rightarrow K^+K^-$, $K^0_S K\pi$
146±55	367	BISELLO	91C	DM2	$e^+e^- \rightarrow K^0_S K^\pm\pi^\mp$
207±45		[6] BISELLO	88B	DM2	$e^+e^- \rightarrow K^+K^-$
185±22		[7] BUON	82	DM1	$e^+e^- \rightarrow$ hadrons
102±36		[8] MANE	82	DM1	$e^+e^- \rightarrow K^0_S K\pi$

PHOTOPRODUCTION

VALUE (MeV)	*DOCUMENT ID*		*TECN*	*COMMENT*
• • • We do not use the following data for averages, fits, limits, etc. • • •				
121±47	BUSENITZ	89	TPS	$\gamma p \rightarrow K^+ K^- X$
80±40	ATKINSON	85C	OMEG	20–70 $\gamma p \rightarrow K\overline{K}X$
100±40	ASTON	81F	OMEG	25–70 $\gamma p \rightarrow K^+ K^- X$

[5] Using BISELLO 88B and MANE 82 data.
[6] From global fit including ρ, ω, ϕ and $\rho(1700)$
[7] From global fit of ρ, ω, ϕ and their radial excitations to channels $\omega\pi^+\pi^-$, K^+K^-, $K^0_S K^0_L$, $K^0_S K^\pm \pi^\mp$. Assume mass 1570 MeV and width 510 MeV for ρ radial excitations, mass 1570 and width 500 MeV for ω radial excitation.
[8] Fit to one channel only, neglecting interference with ω, $\rho(1700)$.

ϕ(1680) DECAY MODES

	Mode	Fraction (Γ_i/Γ)
Γ_1	$K\overline{K}^*(892)+$ c.c.	dominant
Γ_2	$K^0_S K\pi$	seen
Γ_3	$K\overline{K}$	seen
Γ_4	e^+e^-	seen
Γ_5	$\omega\pi\pi$	not seen
Γ_6	$K^+K^-\pi^0$	

ϕ(1680) $\Gamma(i)\Gamma(e^+e^-)/\Gamma(\text{total})$

This combination of a partial width with the partial width into e^+e^- and with the total width is obtained from the integrated cross section into channel (I) in e^+e^- annihilation. We list only data that have not been used to determine the partial width Γ(I) or the branching ratio Γ(I)/total.

$\Gamma(K\overline{K}^*(892)+\text{c.c.}) \times \Gamma(e^+e^-)/\Gamma_{\text{total}}$ — $\Gamma_1\Gamma_4/\Gamma$

VALUE (keV)	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.48±0.14	367	BISELLO	91C	DM2	$e^+e^- \rightarrow K^0_S K^\pm \pi^\mp$

ϕ(1680) BRANCHING RATIOS

$\Gamma(K\overline{K}^*(892)+\text{c.c.})/\Gamma(K^0_S K\pi)$ — Γ_1/Γ_2

VALUE	*DOCUMENT ID*		*TECN*	*COMMENT*
dominant	MANE	82	DM1	$e^+e^- \rightarrow K^0_S K^\pm \pi^\mp$

$\Gamma(K\overline{K})/\Gamma(K\overline{K}^*(892)+\text{c.c.})$ — Γ_3/Γ_1

VALUE	*DOCUMENT ID*		*TECN*	*COMMENT*
0.07 ±0.01	BUON	82	DM1	e^+e^-

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

VALUE	*DOCUMENT ID*		*TECN*	*COMMENT*
<0.10	BUON	82	DM1	e^+e^-

ϕ(1680) REFERENCES

CLEGG	94	ZPHY C62 455	+Donnachie	(LANC, MCHS)
BISELLO	91C	ZPHY C52 227	+Busetto, Castro, Nigro, Pescara+	(DM2 Collab.)
BUSENITZ	89	PR D40 1	+Olszewski, Callahan+	(ILL, FNAL)
BISELLO	88B	ZPHY C39 13	+Busetto+	(PADO, CLER, FRAS, LALO)
ATKINSON	85C	ZPHY C27 233	+	(BONN, CERN, GLAS, LANC, MCHS, CURIN+)
BUON	82	PL 118B 221	+Bisello, Bizot, Cordier, Delcourt+	(LALO, MONP)
MANE	82	PL 112B 178	+Bisello, Bizot, Buon, Delcourt, Fayard+	(LALO)
ASTON	81F	PL 104B 231		(BONN, CERN, EPOL, GLAS, LANC, MCHS+)

OTHER RELATED PAPERS

ACHASOV	97F	PAN 60 2029 Translated from YAF 60 2212.	N.N. Achasov, Kozhevnikov	(NOVM)
ATKINSON	86C	ZPHY C30 541	+	(BONN, CERN, GLAS, LANC, MCHS, CURIN+)
ATKINSON	84	NP B231 15	+	(BONN, CERN, GLAS, LANC, MCHS, CURIN+)
ATKINSON	84B	NP B231 1	+	(BONN, CERN, GLAS, LANC, MCHS, CURIN+)
ATKINSON	83C	NP B229 269	+	(BONN, CERN, GLAS, LANC, MCHS, CURIN+)
CORDIER	81	PL 106B 155	+Bisello, Bizot, Buon, Delcourt, Mane	(ORSAY)
MANE	81	PL 99B 261	+Bisello, Bizot, Buon, Cordier, Delcourt	(ORSAY)
ASTON	80F	NP B174 269		(BONN, CERN, EPOL, GLAS, LANC, MCHS+)