$\phi(1680)$

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

$\phi(1680)$ 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	$e^+e^- \to K^+K^-$, $K^0_S K\pi$
1657±27	367	BISELLO	91C	DM2	$e^+e^- \to K^0_S K^\pm \pi^\mp$
1680±10		[2] BUON	82	DM1	$e^+e^- \to$ hadrons
• • • We do not use the following data for averages, fits, limits, etc. • • •					
~ 1500		[3] ACHASOV	98H	RVUE	$e^+e^- \to \pi^+\pi^-\pi^0$, $\omega\pi^+\pi^-$, K^+K^-
~ 1900		[4] ACHASOV	98H	RVUE	$e^+e^- \to K^0_S K^\pm \pi^\mp$
1655±17		[5] BISELLO	88B	DM2	$e^+e^- \to K^+K^-$
1677±12		[6] MANE	82	DM1	$e^+e^- \to K^0_S K\pi$

PHOTOPRODUCTION

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

[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] Using data from IVANOV 81, BARKOV 87, BISELLO 88B, DOLINSKY 91, and ANTONELLI 92.

[4] Using the data from BISELLO 91C.

[5] From global fit including ρ, ω, ϕ and $\rho(1700)$ assume mass 1570 MeV and width 510 MeV for ρ radial excitation.

[6] 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		[7] CLEGG	94	RVUE	$e^+e^- \to K^+K^-$, $K^0_S K\pi$
146±55	367	BISELLO	91C	DM2	$e^+e^- \to K^0_S K^\pm \pi^\mp$
207±45		[8] BISELLO	88B	DM2	$e^+e^- \to K^+K^-$
185±22		[9] BUON	82	DM1	$e^+e^- \to$ hadrons
102±36		[10] MANE	82	DM1	$e^+e^- \to K^0_S K\pi$

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 $\gamma p \rightarrow K^+ K^- X$

[7] Using BISELLO 88B and MANE 82 data.
[8] From global fit including ρ, ω, ϕ and $\rho(1700)$
[9] 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.
[10] Fit to one channel only, neglecting interference with ω, $\rho(1700)$.

$\phi(1680)$ 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	$K^+K^-\pi^0$	

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

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.

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

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	$e^+e^- \rightarrow K^0_S K^\pm \pi^\mp$

$\phi(1680)$ BRANCHING RATIOS

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

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

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

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

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

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

ϕ(1680) REFERENCES

ACHASOV	98H	PR D57 4334	N.N. Achasov, A.A. Kozhevnikov	
CLEGG	94	ZPHY C62 455	A.B. Clegg, A. Donnachie	(LANC, MCHS)
ANTONELLI	92	ZPHY C56 15	A. Antonelli *et al.*	(DM2 Collab.)
BISELLO	91C	ZPHY C52 227	D. Bisello *et al.*	(DM2 Collab.)
DOLINSKY	91	PRPL 202 99	S.I. Dolinsky *et al.*	(NOVO)
BUSENITZ	89	PR D40 1	J.K. Busenitz *et al.*	(ILL, FNAL)
BISELLO	88B	ZPHY C39 13	D. Bisello *et al.*	(PADO, CLER, FRAS+)
BARKOV	87	JETPL 46 164	L.M. Barkov *et al.*	(NOVO)
		Translated from ZETFP 46 132.		
ATKINSON	85C	ZPHY C27 233	M. Atkinson *et al.*	(BONN, CERN, GLAS+)
BUON	82	PL 118B 221	J. Buon *et al.*	(LALO, MONP)
MANE	82	PL 112B 178	F. Mane *et al.*	(LALO)
ASTON	81F	PL 104B 231	D. Aston	(BONN, CERN, EPOL, GLAS, LANC+)
IVANOV	81	PL 107B 297	P.M. Ivanov *et al.*	(NOVO)

OTHER RELATED PAPERS

ABELE	99D	PL B468 178	A. Abele *et al.*	(Crystal Barrel Collab.)
ACHASOV	97F	PAN 60 2029	N.N. Achasov, A.A. Kozhevnikov	(NOVM)
		Translated from YAF 60 2212.		
ATKINSON	86C	ZPHY C30 541	M. Atkinson *et al.*	(BONN, CERN, GLAS+)
ATKINSON	84	NP B231 15	M. Atkinson *et al.*	(BONN, CERN, GLAS+)
ATKINSON	84B	NP B231 1	M. Atkinson *et al.*	(BONN, CERN, GLAS+)
ATKINSON	83C	NP B229 269	M. Atkinson *et al.*	(BONN, CERN, GLAS+)
CORDIER	81	PL 106B 155	A. Cordier *et al.*	(ORSAY)
MANE	81	PL 99B 261	F. Mane *et al.*	(ORSAY)
ASTON	80F	NP B174 269	D. Aston	(BONN, CERN, EPOL, GLAS, LANC+)