

$\phi(1680)$

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

$\phi(1680)$ MASS

e^+e^- PRODUCTION

<u>VALUE (MeV)</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
1680 ± 20 OUR ESTIMATE				
1681 ± 8 OUR AVERAGE				
1700 ± 20		¹ CLEGG	94 RVUE	$e^+e^- \rightarrow K^+K^-,$ $K_S^0 K\pi$
1657 ± 27	367	BISELLO	91C DM2	$e^+e^- \rightarrow K_S^0 K^\pm \pi^\mp$
1680 ± 10		² BUON	82 DM1	$e^+e^- \rightarrow$ hadrons
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●				
~ 1500		³ ACHASOV	98H RVUE	$e^+e^- \rightarrow \pi^+\pi^-\pi^0,$ $\omega\pi^+\pi^-, K^+K^-$
~ 1900		⁴ ACHASOV	98H RVUE	$e^+e^- \rightarrow K_S^0 K^\pm \pi^\mp$
1655 ± 17		⁵ BISELLO	88B DM2	$e^+e^- \rightarrow K^+K^-$
1677 ± 12		⁶ MANE	82 DM1	$e^+e^- \rightarrow K_S^0 K\pi$

PHOTOPRODUCTION

<u>VALUE (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
● ● ● 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 $\gamma p \rightarrow K\bar{K}X$
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 $\omega\pi^+\pi^-, K^+K^-, K_S^0 K_L^0, K_S^0 K^\pm \pi^\mp$. 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

<u>VALUE (MeV)</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
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	$e^+e^- \rightarrow K^+K^-,$ $K_S^0 K\pi$
146 ± 55	367	BISELLO	91C DM2	$e^+e^- \rightarrow K_S^0 K^\pm \pi^\mp$
207 ± 45		⁸ BISELLO	88B DM2	$e^+e^- \rightarrow K^+K^-$
185 ± 22		⁹ BUON	82 DM1	$e^+e^- \rightarrow$ hadrons
102 ± 36		¹⁰ MANE	82 DM1	$e^+e^- \rightarrow K_S^0 K\pi$

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 $\gamma p \rightarrow K \bar{K} X$
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^- , $K_S^0 K_L^0$, $K_S^0 K^\pm \pi^\mp$. 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 $K \bar{K}^*(892) + \text{c.c.}$	dominant
Γ_2 $K_S^0 K \pi$	seen
Γ_3 $K \bar{K}$	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 $\Gamma(I)$ or the branching ratio $\Gamma(I)/\text{total}$.

VALUE (keV)	EVTS	DOCUMENT ID	TECN	COMMENT	$\Gamma_1\Gamma_4/\Gamma$
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• • • We do not use the following data for averages, fits, limits, etc. • • •

0.48±0.14	367	BISELLO	91C DM2	$e^+e^- \rightarrow K_S^0 K^\pm \pi^\mp$	
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$\phi(1680)$ BRANCHING RATIOS

$\Gamma(K \bar{K}^*(892) + \text{c.c.})/\Gamma(K_S^0 K \pi)$	Γ_1/Γ_2
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VALUE	DOCUMENT ID	TECN	COMMENT
dominant	MANE	82 DM1	$e^+e^- \rightarrow K_S^0 K^\pm \pi^\mp$

$\Gamma(K \bar{K})/\Gamma(K \bar{K}^*(892) + \text{c.c.})$	Γ_3/Γ_1
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VALUE	DOCUMENT ID	TECN	COMMENT
0.07 ± 0.01	BUON	82 DM1	e^+e^-

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

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<0.10	BUON	82 DM1	e^+e^-

 $\phi(1680)$ 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 <i>et al.</i>	(DM2 Collab.)
BISELLO	91C	ZPHY C52 227	D. Bisello <i>et al.</i>	(DM2 Collab.)
DOLINSKY	91	PRPL 202 99	S.I. Dolinsky <i>et al.</i>	(NOVO)
BUSENITZ	89	PR D40 1	J.K. Busenitz <i>et al.</i>	(ILL, FNAL)
BISELLO	88B	ZPHY C39 13	D. Bisello <i>et al.</i>	(PADO, CLER, FRAS+)
BARKOV	87	JETPL 46 164	L.M. Barkov <i>et al.</i>	(NOVO)
		Translated from ZETFP 46 132.		
ATKINSON	85C	ZPHY C27 233	M. Atkinson <i>et al.</i>	(BONN, CERN, GLAS+)
BUON	82	PL 118B 221	J. Buon <i>et al.</i>	(LALO, MONP)
MANE	82	PL 112B 178	F. Mane <i>et al.</i>	(LALO)
ASTON	81F	PL 104B 231	D. Aston	(BONN, CERN, EPOL, GLAS, LANC+)
IVANOV	81	PL 107B 297	P.M. Ivanov <i>et al.</i>	(NOVO)

OTHER RELATED PAPERS

ABELE	99D	PL B468 178	A. Abele <i>et al.</i>	(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 <i>et al.</i>	(BONN, CERN, GLAS+)
ATKINSON	84	NP B231 15	M. Atkinson <i>et al.</i>	(BONN, CERN, GLAS+)
ATKINSON	84B	NP B231 1	M. Atkinson <i>et al.</i>	(BONN, CERN, GLAS+)
ATKINSON	83C	NP B229 269	M. Atkinson <i>et al.</i>	(BONN, CERN, GLAS+)
CORDIER	81	PL 106B 155	A. Cordier <i>et al.</i>	(ORSAY)
MANE	81	PL 99B 261	F. Mane <i>et al.</i>	(ORSAY)
ASTON	80F	NP B174 269	D. Aston	(BONN, CERN, EPOL, GLAS, LANC+)