

$\phi(1680)$ 

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

 **$\phi(1680)$  MASS** **$e^+e^-$  PRODUCTION**

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT
<b>1680 ±20</b>	<b>OUR ESTIMATE</b>			
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●				
1694 ± 5 ±15	9.1k	<sup>1</sup> FEDOTOVICH 25	CMD3	$e^+e^- \rightarrow K_S^0 K^\pm \pi^\mp$
1663 ± 5 $\begin{smallmatrix} +16 \\ -4 \end{smallmatrix}$		ABLIKIM	24CB BES3	$J/\psi \rightarrow \phi \eta \pi^0$
1656.8 ± 4.9		<sup>2</sup> LICHARD	23 RVUE	$e^+e^- \rightarrow \Upsilon(nS) \rightarrow \phi \eta \gamma$
1683 ± 7 ± 9		<sup>3</sup> ZHU	23 BELL	$e^+e^- \rightarrow \Upsilon(nS) \rightarrow \phi \eta \gamma$
1678 $\begin{smallmatrix} +5 \\ -3 \end{smallmatrix}$ ± 7		<sup>4</sup> ZHU	23A RVUE	$e^+e^- \rightarrow \eta \phi$
1673 ± 5		<sup>5</sup> ABLIKIM	22L BES3	$2.0\text{--}3.08 e^+e^- \rightarrow K^+ K^- \pi^0$
1680 $\begin{smallmatrix} +12 \\ -13 \end{smallmatrix}$ ±21	1.8k	<sup>6</sup> ABLIKIM	20F BES3	$\psi(2S) \rightarrow K^+ K^- \eta$
1662 ±20		<sup>7</sup> ACHASOV	20C SND	$1.3\text{--}2.0 e^+e^- \rightarrow K^+ K^- \pi^0$
1641 $\begin{smallmatrix} +24 \\ -18 \end{smallmatrix}$		ACHASOV	19 SND	$e^+e^- \rightarrow \pi^+ \pi^- \pi^0 \eta$
1667 ± 5 ±11	3k	<sup>8</sup> IVANOV	19A CMD3	$1.59\text{--}2.007 e^+e^- \rightarrow K^+ K^- \eta$
1700 ±23	2k	<sup>9</sup> ACHASOV	18A SND	$1.3\text{--}2.0 e^+e^- \rightarrow K_S^0 K_L^0 \pi^0$
1674 ±12 ± 6	6.2k	<sup>10</sup> LEES	14H BABR	$e^+e^- \rightarrow K_S^0 K_L^0 \gamma$
1733 ±10 ±10		<sup>11</sup> LEES	12F BABR	$10.6 e^+e^- \rightarrow \phi \pi^+ \pi^- \gamma$
1689 ± 7 ±10	4.8k	<sup>12</sup> SHEN	09 BELL	$10.6 e^+e^- \rightarrow K^+ K^- \pi^+ \pi^- \gamma$
1709 ±20 ±43		<sup>13</sup> AUBERT	08S BABR	$10.6 e^+e^- \rightarrow \text{hadrons}$
1623 ±20	948	<sup>14</sup> AKHMETSHIN 03	CMD2	$1.05\text{--}1.38 e^+e^- \rightarrow K_L^0 K_S^0$
~ 1500		<sup>15</sup> ACHASOV	98H RVUE	$e^+e^- \rightarrow \pi^+ \pi^- \pi^0, \omega \pi^+ \pi^-, K^+ K^-$
~ 1900		<sup>16</sup> ACHASOV	98H RVUE	$e^+e^- \rightarrow K_S^0 K^\pm \pi^\mp$
1700 ±20		<sup>17</sup> CLEGG	94 RVUE	$e^+e^- \rightarrow K^+ K^-, K_S^0 K \pi$
1657 ±27	367	BISELLO	91C DM2	$e^+e^- \rightarrow K_S^0 K^\pm \pi^\mp$
1655 ±17		<sup>18</sup> BISELLO	88B DM2	$e^+e^- \rightarrow K^+ K^-$
1680 ±10		<sup>19</sup> BUON	82 DM1	$e^+e^- \rightarrow \text{hadrons}$
1677 ±12		<sup>20</sup> MANE	82 DM1	$e^+e^- \rightarrow K_S^0 K \pi$

<sup>1</sup> Using a vector dominance fit with contributions from  $\phi(1680)$  and  $\rho(1450)$ .<sup>2</sup> From a VDM fit to ZHU 23  $\eta \phi \gamma$  data with two resonances,  $\phi(1680)$ ,  $\phi(2170)$ , and a third resonance with mass  $1850.7 \pm 5.3$  MeV and width  $25 \pm 35$  MeV of  $1.7 \sigma$  statistical evidence.<sup>3</sup> From a fit using a vector meson dominance model with contributions from  $\phi(1680)$ ,  $\phi(2170)$  and non resonant contribution.<sup>4</sup> From the analysis of the combined measurements of  $\sigma(e^+e^- \rightarrow \eta \phi)$  from BaBar, Belle, BESIII, CMD3.

- <sup>5</sup> From a partial wave amplitude analysis at  $\sqrt{s} = 2.125$  GeV which includes all the possible intermediate states that match  $J^{PC}$  conservation in the subsequent two-body decay. The intermediate states are parameterized with the relativistic Breit-Wigner functions. Statistical error only.
- <sup>6</sup> Seen in  $\psi(2S)$  decay with branching ratio  $\psi(2S) \rightarrow X\eta \rightarrow K^+K^-\eta = (12.0 \pm 1.3_{-6.9}^{+6.5}) \times 10^{-6}$ .
- <sup>7</sup> From a fit using a vector meson dominance model with contribution from  $\rho(770)$ ,  $\omega(782)$ ,  $\phi(1020)$ ,  $\omega(1420)$ ,  $\rho(1450)$ .
- <sup>8</sup> From a fit with coherent interference of the  $\phi(1680)$  with a non-resonant contribution.
- <sup>9</sup> Assuming the  $K\bar{K}^*(892) + c.c.$  dynamics. Systematic uncertainties not estimated.
- <sup>10</sup> Using a vector meson dominance model with contribution from  $\phi(1020)$ ,  $\phi(1680)$ , and higher mass excitations of  $\rho(770)$  and  $\omega(782)$ .
- <sup>11</sup> Using events with  $\pi\pi$  invariant mass less than 0.85 GeV.
- <sup>12</sup> From a fit with two incoherent Breit-Wigners.
- <sup>13</sup> From the simultaneous fit to the  $K\bar{K}^*(892) + c.c.$  and  $\phi\eta$  data from AUBERT 08S using the results of AUBERT 07AK.
- <sup>14</sup> From the combined fit of AKHMETSHIN 03 and MANE 81 also including  $\rho$ ,  $\omega$ , and  $\phi$ . Neither isospin nor flavor structure known.
- <sup>15</sup> Using data from IVANOV 81, BARKOV 87, BISELLO 88B, DOLINSKY 91, and ANTONELLI 92.
- <sup>16</sup> Using the data from BISELLO 91C.
- <sup>17</sup> Using BISELLO 88B and MANE 82 data.
- <sup>18</sup> From global fit including  $\rho$ ,  $\omega$ ,  $\phi$  and  $\rho(1700)$  assume mass 1570 MeV and width 510 MeV for  $\rho$  radial excitation.
- <sup>19</sup> From global fit of  $\rho$ ,  $\omega$ ,  $\phi$  and their radial excitations to channels  $\omega\pi^+\pi^-$ ,  $K^+K^-$ ,  $K_S^0K_L^0$ ,  $K_S^0K^\pm\pi^\mp$ . Assume mass 1570 MeV and width 510 MeV for  $\rho$  radial excitations, mass 1570 and width 500 MeV for  $\omega$  radial excitation.
- <sup>20</sup> Fit to one channel only, neglecting interference with  $\omega$ ,  $\rho(1700)$ .

## $p\bar{p}$ ANNIHILATION

VALUE (MeV)	DOCUMENT ID	TECN	COMMENT
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●			
$1700 \pm 8$	<sup>1</sup> AMSLER	06	CBAR $0.9 \bar{p}p \rightarrow K^+K^-\pi^0$
<sup>1</sup> Could also be $\rho(1700)$ .			

## $\phi(1680)$ WIDTH

### $e^+e^-$ PRODUCTION

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT
<b><math>150 \pm 50</math></b>	<b>OUR ESTIMATE</b>	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. ● ● ●				
$204 \pm 18 \pm 22$	9.1k	<sup>1</sup> FEDOTOVICH 25	CMD3	$e^+e^- \rightarrow K_S^0 K^\pm \pi^\mp$
$159 \pm 15 \pm 11$		ABLIKIM	24CB	BES3 $J/\psi \rightarrow \phi\eta\pi^0$
$150.8 \pm 7.0$		<sup>2</sup> LICHARD	23	RVUE $e^+e^- \rightarrow \Upsilon(nS) \rightarrow \phi\eta\gamma$
$149 \pm 12 \pm 13$		<sup>3</sup> ZHU	23	BELL $e^+e^- \rightarrow \Upsilon(nS) \rightarrow \phi\eta\gamma$
$156 \pm 5 \pm 9$		<sup>4</sup> ZHU	23A	RVUE $e^+e^- \rightarrow \eta\phi$
$172 \pm 8$		<sup>5</sup> ABLIKIM	22L	BES3 $2.0-3.08 e^+e^- \rightarrow K^+K^-\pi^0$
$185_{-26}^{+30} \pm 25_{-47}$	1.8k	<sup>6</sup> ABLIKIM	20F	BES3 $\psi(2S) \rightarrow K^+K^-\eta$
$159 \pm 32$		<sup>7</sup> ACHASOV	20C	SND $1.3-2.0 e^+e^- \rightarrow K^+K^-\pi^0$

103	$\begin{matrix} +26 \\ -24 \end{matrix}$		ACHASOV	19	SND	$e^+ e^- \rightarrow \pi^+ \pi^- \pi^0 \eta$
176	$\pm 23 \pm 38$	3k	<sup>8</sup> IVANOV	19A	CMD3	$1.59-2.007 e^+ e^- \rightarrow K^+ K^- \eta$
300	$\pm 50$	2k	<sup>9</sup> ACHASOV	18A	SND	$1.3-2.0 e^+ e^- \rightarrow K_S^0 K_L^0 \pi^0$
165	$\pm 38 \pm 70$	6.2k	<sup>10</sup> LEES	14H	BABR	$e^+ e^- \rightarrow K_S^0 K_L^0 \gamma$
300	$\pm 15 \pm 37$		<sup>11</sup> LEES	12F	BABR	$10.6 e^+ e^- \rightarrow \phi \pi^+ \pi^- \gamma$
211	$\pm 14 \pm 19$	4.8k	<sup>12</sup> SHEN	09	BELL	$10.6 e^+ e^- \rightarrow K^+ K^- \pi^+ \pi^- \gamma$
322	$\pm 77 \pm 160$		<sup>13</sup> AUBERT	08S	BABR	$10.6 e^+ e^- \rightarrow \text{hadrons}$
139	$\pm 60$	948	<sup>14</sup> AKHMETSHIN	03	CMD2	$1.05-1.38 e^+ e^- \rightarrow K_L^0 K_S^0$
300	$\pm 60$		<sup>15</sup> CLEGG	94	RVUE	$e^+ e^- \rightarrow K^+ K^-, K_S^0 K \pi$
146	$\pm 55$	367	BISELLO	91C	DM2	$e^+ e^- \rightarrow K_S^0 K^\pm \pi^\mp$
207	$\pm 45$		<sup>16</sup> BISELLO	88B	DM2	$e^+ e^- \rightarrow K^+ K^-$
185	$\pm 22$		<sup>17</sup> BUON	82	DM1	$e^+ e^- \rightarrow \text{hadrons}$
102	$\pm 36$		<sup>18</sup> MANE	82	DM1	$e^+ e^- \rightarrow K_S^0 K \pi$

<sup>1</sup> Using a vector dominance fit with contributions from  $\phi(1680)$  and  $\rho(1450)$ .

<sup>2</sup> From a VDM fit to ZHU 23  $\eta\phi\gamma$  data with two resonances,  $\phi(1680)$ ,  $\phi(2170)$ , and a third resonance with mass  $1850.7 \pm 5.3$  MeV and width  $25 \pm 35$  MeV of 1.7  $\sigma$  statistical evidence.

<sup>3</sup> From a fit using a vector meson dominance model with contributions from  $\phi(1680)$ ,  $\phi(2170)$  and non resonant contribution.

<sup>4</sup> From the analysis of the combined measurements of  $\sigma(e^+ e^- \rightarrow \eta\phi)$  from BaBar, Belle, BESIII, CMD3.

<sup>5</sup> From a partial wave amplitude analysis at  $\sqrt{s} = 2.125$  GeV which includes all the possible intermediate states that match  $J^{PC}$  conservation in the subsequent two-body decay. The intermediate states are parameterized with the relativistic Breit-Wigner functions. Statistical error only.

<sup>6</sup> Seen in  $\psi(2S)$  decay with branching ratio  $\psi(2S) \rightarrow X\eta \rightarrow K^+ K^- \eta = (12.0 \pm 1.3^{+6.5}_{-6.9}) \times 10^{-6}$ .

<sup>7</sup> From a fit using a vector meson dominance model with contribution from  $\rho(770)$ ,  $\omega(782)$ ,  $\phi(1020)$ ,  $\omega(1420)$ ,  $\rho(1450)$ .

<sup>8</sup> From a fit with coherent interference of the  $\phi(1680)$  with a non-resonant contribution.

<sup>9</sup> Assuming the  $K\bar{K}^*(892) + \text{c.c.}$  dynamics. Systematic uncertainties not estimated.

<sup>10</sup> Using a vector meson dominance model with contribution from  $\phi(1020)$ ,  $\phi(1680)$ , and higher mass excitations of  $\rho(770)$  and  $\omega(782)$ .

<sup>11</sup> Using events with  $\pi\pi$  invariant mass less than 0.85 GeV.

<sup>12</sup> From a fit with two incoherent Breit-Wigners.

<sup>13</sup> From the simultaneous fit to the  $K\bar{K}^*(892) + \text{c.c.}$  and  $\phi\eta$  data from AUBERT 08S using the results of AUBERT 07AK.

<sup>14</sup> From the combined fit of AKHMETSHIN 03 and MANE 81 also including  $\rho$ ,  $\omega$ , and  $\phi$ . Neither isospin nor flavor structure known.

<sup>15</sup> Using BISELLO 88B and MANE 82 data.

<sup>16</sup> From global fit including  $\rho$ ,  $\omega$ ,  $\phi$  and  $\rho(1700)$

<sup>17</sup> From global fit of  $\rho$ ,  $\omega$ ,  $\phi$  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  $\rho$  radial excitations, mass 1570 and width 500 MeV for  $\omega$  radial excitation.

<sup>18</sup> Fit to one channel only, neglecting interference with  $\omega$ ,  $\rho(1700)$ .

**$\rho\bar{\rho}$  ANNIHILATION**

VALUE (MeV)	DOCUMENT ID	TECN	COMMENT
$143 \pm 24$	<sup>1</sup> AMSLER	06	CBAR 0.9 $\bar{p}p \rightarrow K^+ K^- \pi^0$
<sup>1</sup> Could also be $\rho(1700)$ .			

**$\phi(1680)$  DECAY MODES**

Mode	Fraction ( $\Gamma_i/\Gamma$ )
$\Gamma_1$ $K\bar{K}^*(892) + \text{c.c.}$	seen
$\Gamma_2$ $K_S^0 K \pi$	seen
$\Gamma_3$ $K\bar{K}$	seen
$\Gamma_4$ $K_L^0 K_S^0$	
$\Gamma_5$ $e^+ e^-$	seen
$\Gamma_6$ $\omega \pi \pi$	not seen
$\Gamma_7$ $\phi \pi \pi$	
$\Gamma_8$ $K^+ K^- \pi^+ \pi^-$	seen
$\Gamma_9$ $\eta \phi$	seen
$\Gamma_{10}$ $\eta \gamma$	seen
$\Gamma_{11}$ $K^+ K^- \pi^0$	
$\Gamma_{12}$ $\rho(770) \pi$	not seen
$\Gamma_{13}$ $f'_2(1525) \gamma$	not seen

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

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  $\Gamma(I)/\text{total}$ .

**$\Gamma(K_L^0 K_S^0) \times \Gamma(e^+ e^-)/\Gamma_{\text{total}}$   $\Gamma_4 \Gamma_5/\Gamma$**

VALUE (eV)	EVTS	DOCUMENT ID	TECN	COMMENT
$14.3 \pm 2.4 \pm 6.2$	6.2k	<sup>1</sup> LEES	14H	BABR $e^+ e^- \rightarrow K_S^0 K_L^0 \gamma$
<sup>1</sup> Using a vector meson dominance model with contribution from $\phi(1020)$ , $\phi(1680)$ , and higher mass excitations of $\rho(770)$ and $\omega(782)$ .				

**$\Gamma(\phi \pi \pi) \times \Gamma(e^+ e^-)/\Gamma_{\text{total}}$   $\Gamma_7 \Gamma_5/\Gamma$**

VALUE ( $10^{-2}$ keV)	DOCUMENT ID	TECN	COMMENT
$4.2 \pm 0.2 \pm 0.3$	LEES	12F	BABR $10.6 e^+ e^- \rightarrow \phi \pi^+ \pi^- \gamma$

**$\Gamma(\eta \phi) \times \Gamma(e^+ e^-)/\Gamma_{\text{total}}$   $\Gamma_9 \Gamma_5/\Gamma$**

VALUE (eV)	EVTS	DOCUMENT ID	TECN	COMMENT
$122 \pm 6 \pm 13$		<sup>1</sup> ZHU	23	BELL $e^+ e^- \rightarrow \Upsilon(nS) \rightarrow \phi \eta \gamma$

$65_{-4}^{+5} \pm 13$ to $215_{-5}^{+8} \pm 11$	<sup>2</sup> ZHU	23A RVUE	$e^+e^- \rightarrow \eta\phi$
$94 \pm 13 \pm 15$	3k	<sup>3</sup> IVANOV	19A CMD3 $1.59\text{--}2.007 e^+e^- \rightarrow K^+K^-\eta$

<sup>1</sup> From a solution of the fit using a vector meson dominance model with contributions from  $\phi(1680)$ ,  $\phi(2170)$  and non resonant contribution. Other solutions with equal fit quality give  $(219 \pm 15 \pm 18)$  eV,  $(163 \pm 11 \pm 13)$  eV and  $(203 \pm 12 \pm 18)$  eV.

<sup>2</sup> From the analysis of the combined measurements of  $\sigma(e^+e^- \rightarrow \eta\phi)$  from BaBar, Belle, BESIII, CMD3. Four solutions are found, with equal fit quality:  $(79 \pm 4 \pm 16)$  eV,  $(127 \pm 5 \pm 12)$  eV,  $(65_{-4}^{+5} \pm 13)$  eV,  $(215_{-5}^{+8} \pm 11)$  eV.

<sup>3</sup> From a fit with coherent interference of the  $\phi(1680)$  with a non-resonant contribution.

**$\Gamma(K\bar{K}^*(892)+c.c.)/\Gamma_{\text{total}} \times \Gamma(e^+e^-)/\Gamma_{\text{total}}$   $\Gamma_1\Gamma_5/\Gamma$**

VALUE (eV)      EVTS      DOCUMENT ID      TECN      COMMENT

• • • We do not use the following data for averages, fits, limits, etc. • • •

$427 \pm 40 \pm 21$	9.1k	<sup>1</sup> FEDOTOVICH 25	CMD3 $e^+e^- \rightarrow K_S^0 K^\pm \pi^\mp$
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<sup>1</sup> Using a vector dominance fit with contributions from  $\phi(1680)$  and  $\rho(1450)$ .

**$\phi(1680) \Gamma(i)\Gamma(e^+e^-)/\Gamma^2(\text{total})$**

This combination of a branching ratio into channel (*i*) and branching ratio into  $e^+e^-$  is directly measured and obtained from the cross section at the peak. We list only data that have not been used to determine the branching ratio into (*i*) or  $e^+e^-$ .

**$\Gamma(K_L^0 K_S^0)/\Gamma_{\text{total}} \times \Gamma(e^+e^-)/\Gamma_{\text{total}}$   $\Gamma_4/\Gamma \times \Gamma_5/\Gamma$**

VALUE (units  $10^{-6}$ )      EVTS      DOCUMENT ID      TECN      COMMENT

• • • We do not use the following data for averages, fits, limits, etc. • • •

$0.131 \pm 0.059$	948	<sup>1</sup> AKHMETSHIN 03	CMD2 $1.05\text{--}1.38 e^+e^- \rightarrow K_L^0 K_S^0$
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<sup>1</sup> From the combined fit of AKHMETSHIN 03 and MANE 81 also including  $\rho$ ,  $\omega$ , and  $\phi$ . Neither isospin nor flavor structure known. Recalculated by us.

**$\Gamma(K\bar{K}^*(892)+c.c.)/\Gamma_{\text{total}} \times \Gamma(e^+e^-)/\Gamma_{\text{total}}$   $\Gamma_1/\Gamma \times \Gamma_5/\Gamma$**

VALUE (units  $10^{-6}$ )      EVTS      DOCUMENT ID      TECN      COMMENT

• • • We do not use the following data for averages, fits, limits, etc. • • •

$1.15 \pm 0.16 \pm 0.01$		<sup>1</sup> AUBERT 08S	BABR $10.6 e^+e^- \rightarrow K\bar{K}^*(892)\gamma + c.c.$
$3.29 \pm 1.57$	367	<sup>2</sup> BISELLO 91C	DM2 $1.35\text{--}2.40 e^+e^- \rightarrow K_S^0 K^\pm \pi^\mp$

<sup>1</sup> From the simultaneous fit to the  $K\bar{K}^*(892) + c.c.$  and  $\phi\eta$  data from AUBERT 08S using the results of AUBERT 07AK.

<sup>2</sup> Recalculated by us with the published value of  $B(K\bar{K}^*(892) + c.c.) \times \Gamma(e^+e^-)$ .

**$\Gamma(\phi\pi\pi)/\Gamma_{\text{total}} \times \Gamma(e^+e^-)/\Gamma_{\text{total}}$   $\Gamma_7/\Gamma \times \Gamma_5/\Gamma$**

VALUE (units  $10^{-7}$ )      EVTS      DOCUMENT ID      TECN      COMMENT

• • • We do not use the following data for averages, fits, limits, etc. • • •

$1.86 \pm 0.14 \pm 0.21$	4.8k	<sup>1</sup> SHEN 09	BELL $10.6 e^+e^- \rightarrow K^+K^-\pi^+\pi^-\gamma$
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<sup>1</sup> Multiplied by 3/2 to take into account the  $\phi\pi^0\pi^0$  mode. Using  $B(\phi \rightarrow K^+K^-) = (49.2 \pm 0.6)\%$ .

$$\Gamma(\eta\phi)/\Gamma_{\text{total}} \times \Gamma(e^+e^-)/\Gamma_{\text{total}} \qquad \Gamma_9/\Gamma \times \Gamma_5/\Gamma$$

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. • • •

$5.64^{+1.74}_{-1.80}$		ACHASOV	19	SND	$e^+e^- \rightarrow \pi^+\pi^-\pi^0\eta$
$5.3 \pm 0.6 \pm 0.9$	3k	<sup>1</sup> IVANOV	19A	CMD3	$1.59\text{--}2.007 e^+e^- \rightarrow K^+K^-\eta$
$4.3 \pm 1.0 \pm 0.9$		<sup>2</sup> AUBERT	08S	BABR	$10.6 e^+e^- \rightarrow \phi\eta\gamma$

<sup>1</sup>From a fit with coherent interference of the  $\phi(1680)$  with a non-resonant contribution.

<sup>2</sup>From the simultaneous fit to the  $K\bar{K}^*(892) + \text{c.c.}$  and  $\phi\eta$  data from AUBERT 08S using the results of AUBERT 07AK.

### $\phi(1680)$ BRANCHING RATIOS

$$\Gamma(K\bar{K}^*(892) + \text{c.c.})/\Gamma(K_S^0 K\pi) \qquad \Gamma_1/\Gamma_2$$

VALUE	DOCUMENT ID	TECN	COMMENT
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dominant	MANE	82	DM1	$e^+e^- \rightarrow K_S^0 K^\pm \pi^\mp$
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$$\Gamma(K\bar{K})/\Gamma(K\bar{K}^*(892) + \text{c.c.}) \qquad \Gamma_3/\Gamma_1$$

VALUE	DOCUMENT ID	TECN	COMMENT
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• • • We do not use the following data for averages, fits, limits, etc. • • •

$0.07 \pm 0.01$	BUON	82	DM1	$e^+e^-$
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$$\Gamma(\omega\pi\pi)/\Gamma(K\bar{K}^*(892) + \text{c.c.}) \qquad \Gamma_6/\Gamma_1$$

VALUE	DOCUMENT ID	TECN	COMMENT
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$<0.10$	BUON	82	DM1	$e^+e^-$
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$$\Gamma(\eta\phi)/\Gamma_{\text{total}} \qquad \Gamma_9/\Gamma$$

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
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seen	35	<sup>1</sup> ACHASOV	14	SND	$1.15\text{--}2.00 e^+e^- \rightarrow \eta\gamma$
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<sup>1</sup>From a phenomenological model based on vector meson dominance with  $\rho(1450)$  and  $\phi(1680)$  masses and widths from the PDG 12.

$$\Gamma(\eta\phi)/\Gamma(K\bar{K}^*(892) + \text{c.c.}) \qquad \Gamma_9/\Gamma_1$$

VALUE	DOCUMENT ID	TECN	COMMENT
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• • • We do not use the following data for averages, fits, limits, etc. • • •

$\approx 0.37$	<sup>1</sup> AUBERT	08S	BABR	$10.6 e^+e^- \rightarrow \text{hadrons}$
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<sup>1</sup>From the fit including data from AUBERT 07AK.

$$\Gamma(\eta\gamma)/\Gamma_{\text{total}} \qquad \Gamma_{10}/\Gamma$$

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
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seen	35	<sup>1</sup> ACHASOV	14	SND	$1.15\text{--}2.00 e^+e^- \rightarrow \eta\gamma$
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<sup>1</sup>From a phenomenological model based on vector meson dominance with  $\rho(1450)$  and  $\phi(1680)$  masses and widths from the PDG 12.

$$\Gamma(\rho(770)\pi)/\Gamma_{\text{total}} \qquad \Gamma_{12}/\Gamma$$

VALUE	DOCUMENT ID	TECN	COMMENT
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not seen	<sup>1</sup> DIMOVA	25	SND	$e^+e^- \rightarrow \pi^+\pi^-\pi^0$
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<sup>1</sup>From a fit to the cross section with contributions from  $\omega(782)$ ,  $\phi(1020)$ ,  $\omega(1420)$ ,  $\omega(1650)$ , and  $\phi(1680)$ .

$\Gamma(f'_2(1525)\gamma)/\Gamma_{\text{total}}$  $\Gamma_{13}/\Gamma$ 

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>not seen</b>	<sup>1</sup> ACHASOV	22	SND 1.17–2.00 $e^+e^- \rightarrow \eta\eta\gamma$

<sup>1</sup>The 90% CL upper limit on the Born cross sections  $\sigma(e^+e^- \rightarrow \phi(1680) \rightarrow f'_2(1525)\gamma \rightarrow \eta\eta\gamma)$  and  $\sigma(e^+e^- \rightarrow \rho(1700) \rightarrow f_0(1500)\gamma \rightarrow \eta\eta\gamma)$  is 10.6 pb.

 **$\phi(1680)$  REFERENCES**

DIMOVA	25	PPN 56 820	T.V. Dimova <i>et al.</i>	(SND Collab.)
FEDOTOVICH	25	PPN 56 434	G.V. Fedotovitch <i>et al.</i>	(CMD-3 Collab.)
ABLIKIM	24CB	PR D110 112014	M. Ablikim <i>et al.</i>	(BESIII Collab.)
LICHARD	23	PR D108 092005	P. Lichard	(OPAV, CTUP)
ZHU	23	PR D107 012006	W. Zhu <i>et al.</i>	(BELLE Collab.)
ZHU	23A	CP C47 113003	W. Zhu, X. Wang	(RVUE)
ABLIKIM	22L	JHEP 2207 045	M. Ablikim <i>et al.</i>	(BESIII Collab.)
ACHASOV	22	EPJ C82 168	M.N. Achasov <i>et al.</i>	(SND Collab.)
ABLIKIM	20F	PR D101 032008	M. Ablikim <i>et al.</i>	(BESIII Collab.)
ACHASOV	20C	EPJ C80 1139	M.N. Achasov <i>et al.</i>	(SND Collab.)
ACHASOV	19	PR D99 112004	M.N. Achasov <i>et al.</i>	(SND Collab.)
IVANOV	19A	PL B798 134946	V.L. Ivanov <i>et al.</i>	(CMD-3 Collab.)
ACHASOV	18A	PR D97 032011	M.N. Achasov <i>et al.</i>	(SND Collab.)
ACHASOV	14	PR D90 032002	M.N. Achasov <i>et al.</i>	(SND Collab.)
LEES	14H	PR D89 092002	J.P. Lees <i>et al.</i>	(BABAR Collab.)
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AMSLER	06	PL B639 165	C. Amsler <i>et al.</i>	(Crystal Barrel Collab.)
AKHMETSHIN	03	PL B551 27	R.R. Akhmetshin <i>et al.</i>	(Novosibirsk CMD-2 Collab.)
Also		PAN 65 1222	E.V. Anashkin, V.M. Aulchenko, R.R. Akhmetshin	
		Translated from YAF 65 1255.		
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)
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.		
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)
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MANE	81	PL 99B 261	F. Mane <i>et al.</i>	(ORSAY)