

# $\psi(3770)$

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

## $\psi(3770)$ MASS (MeV)

OUR FIT includes measurements of  $m_{\psi(2S)}$ ,  $m_{\psi(3770)}$ , and  $m_{\psi(3770)} - m_{\psi(2S)}$ .

| VALUE (MeV)   | EVTS         | DOCUMENT ID  | TECN | COMMENT  |
|---|--------------|--------------|------|--|
| <b>3773.15 ± 0.33 OUR FIT</b>   |              |              |      |  |
| <b>3778.1 ± 1.2 OUR AVERAGE</b>   |              |              |      |  |
| 3779.2  | +1.8<br>-1.7 | +0.6<br>-0.8 | 1    | ANASHIN 12A KEDR $e^+e^- \rightarrow D\bar{D}$       |
| 3775.5  | ±2.4         | ±0.5         | 57   | AUBERT 08B BABR $B \rightarrow D\bar{D}K$            |
| 3776  | ±5           | ±4           | 68   | BRODZICKA 08 BELL $B^+ \rightarrow D^0\bar{D}^0K^+$  |
| 3778.8  | ±1.9         | ±0.9         |      | AUBERT 07BE BABR $e^+e^- \rightarrow D\bar{D}\gamma$ |
| ● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ● |              |              |      |  |
| 3772.0  | ±1.9         |              | 2,3  | ABLIKIM 08D BES2 $e^+e^- \rightarrow$ hadrons        |
| 3778.4  | ±3.0         | ±1.3         | 34   | CHISTOV 04 BELL Sup. by BRODZICKA 08                 |

<sup>1</sup> Taking into account interference between the resonant and non-resonant  $D\bar{D}$  production.

<sup>2</sup> Reanalysis of data presented in BAI 02C. From a global fit over the center-of-mass energy region 3.7–5.0 GeV covering the  $\psi(3770)$ ,  $\psi(4040)$ ,  $\psi(4160)$ , and  $\psi(4415)$  resonances. Phase angle fixed in the fit to  $\delta = 0^\circ$ .

<sup>3</sup> Interference between the resonant and non-resonant  $D\bar{D}$  production not taken into account.

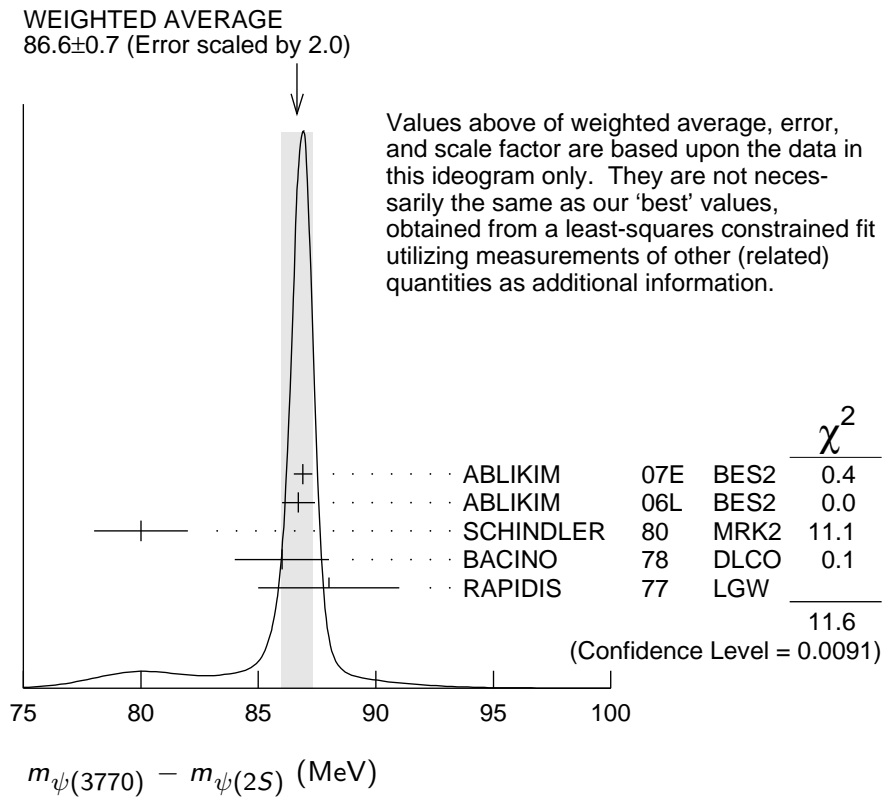
## $m_{\psi(3770)} - m_{\psi(2S)}$

OUR FIT includes measurements of  $m_{\psi(2S)}$ ,  $m_{\psi(3770)}$ , and  $m_{\psi(3770)} - m_{\psi(2S)}$ .

| VALUE (MeV)   | DOCUMENT ID          | TECN | COMMENT                           |
|---|----------------------|------|-----------------------------------|
| <b>87.04 ± 0.33 OUR FIT</b>   |                      |      |                                   |
| <b>86.6 ± 0.7 OUR AVERAGE</b> Error includes scale factor of 2.0. See the ideogram below. |                      |      |                                   |
| 86.9 ± 0.4  | <sup>4</sup> ABLIKIM | 07E  | BES2 $e^+e^- \rightarrow$ hadrons |
| 86.7 ± 0.7  | ABLIKIM              | 06L  | BES2 $e^+e^- \rightarrow$ hadrons |
| 80 ± 2  | SCHINDLER            | 80   | MRK2 $e^+e^-$                     |
| 86 ± 2  | <sup>5</sup> BACINO  | 78   | DLCO $e^+e^-$                     |
| 88 ± 3  | RAPIDIS              | 77   | LGW $e^+e^-$                      |

<sup>4</sup> BES-II  $\psi(2S)$  mass subtracted (see ABLIKIM 06L).

<sup>5</sup> SPEAR  $\psi(2S)$  mass subtracted (see SCHINDLER 80).



### $\psi(3770)$ WIDTH

| VALUE (MeV)                                       | EVTs | DOCUMENT ID            | TECN      | COMMENT                             |
|---|------|------------------------|-----------|-------------------------------------|
| <b>27.2± 1.0 OUR FIT</b>                          |      |                        |           |                                     |
| <b>27.5± 0.9 OUR AVERAGE</b>                      |      |                        |           |                                     |
| 24.9 <sup>+</sup> <sub>-</sub> 4.6+0.5<br>4.0-1.1 |      | <sup>6</sup> ANASHIN   | 12A KEDR  | $e^+e^- \rightarrow D\bar{D}$       |
| 30.4± 8.5   |      | <sup>7,8</sup> ABLIKIM | 08D BES2  | $e^+e^- \rightarrow$ hadrons        |
| 27 ±10 ±5   | 68   | BRODZICKA              | 08 BELL   | $B^+ \rightarrow D^0\bar{D}^0 K^+$  |
| 28.5± 1.2±0.2                                     |      | <sup>8</sup> ABLIKIM   | 07E BES2  | $e^+e^- \rightarrow$ hadrons        |
| 23.5± 3.7±0.9                                     |      | AUBERT                 | 07BE BABR | $e^+e^- \rightarrow D\bar{D}\gamma$ |
| 26.9± 2.4±0.3                                     |      | <sup>8</sup> ABLIKIM   | 06L BES2  | $e^+e^- \rightarrow$ hadrons        |
| 24 ± 5  |      | <sup>8</sup> SCHINDLER | 80 MRK2   | $e^+e^-$                            |
| 24 ± 5  |      | <sup>8</sup> BACINO    | 78 DLCO   | $e^+e^-$                            |
| 28 ± 5  |      | <sup>8</sup> RAPIDIS   | 77 LGW    | $e^+e^-$                            |

<sup>6</sup> Taking into account interference between the resonant and non-resonant  $D\bar{D}$  production.

<sup>7</sup> Reanalysis of data presented in BAI 02C. From a global fit over the center-of-mass energy region 3.7–5.0 GeV covering the  $\psi(3770)$ ,  $\psi(4040)$ ,  $\psi(4160)$ , and  $\psi(4415)$  resonances. Phase angle fixed in the fit to  $\delta = 0^\circ$ .

<sup>8</sup> Interference between the resonant and non-resonant  $D\bar{D}$  production not taken into account.

## $\psi(3770)$ DECAY MODES

In addition to the dominant decay mode to  $D\bar{D}$ ,  $\psi(3770)$  was found to decay into the final states containing the  $J/\psi$  (BAI 05, ADAM 06). ADAMS 06 and HUANG 06A searched for various decay modes with light hadrons and found a statistically significant signal for the decay to  $\phi\eta$  only (ADAMS 06).

| Mode                          | Fraction ( $\Gamma_i/\Gamma$ )     | Scale factor/<br>Confidence level |
|-------------------------------|------------------------------------|-----------------------------------|
| $\Gamma_1$ $D\bar{D}$         | (93 $\pm$ 8 $\pm$ 9) %             | S=2.0                             |
| $\Gamma_2$ $D^0\bar{D}^0$     | (52 $\pm$ 5) %                     | S=2.0                             |
| $\Gamma_3$ $D^+D^-$           | (41 $\pm$ 4) %                     | S=2.0                             |
| $\Gamma_4$ $J/\psi\pi^+\pi^-$ | (1.93 $\pm$ 0.28) $\times 10^{-3}$ |                                   |
| $\Gamma_5$ $J/\psi\pi^0\pi^0$ | (8.0 $\pm$ 3.0) $\times 10^{-4}$   |                                   |
| $\Gamma_6$ $J/\psi\eta$       | (9 $\pm$ 4) $\times 10^{-4}$       |                                   |
| $\Gamma_7$ $J/\psi\pi^0$      | < 2.8 $\times 10^{-4}$             | CL=90%                            |
| $\Gamma_8$ $e^+e^-$           | (9.6 $\pm$ 0.7) $\times 10^{-6}$   | S=1.3                             |

### Decays to light hadrons

|   |                                  |        |
|---|----------------------------------|--------|
| $\Gamma_9$ $b_1(1235)\pi$                         | < 1.4 $\times 10^{-5}$           | CL=90% |
| $\Gamma_{10}$ $\phi\eta'$                         | < 7 $\times 10^{-4}$             | CL=90% |
| $\Gamma_{11}$ $\omega\eta'$                       | < 4 $\times 10^{-4}$             | CL=90% |
| $\Gamma_{12}$ $\rho^0\eta'$                       | < 6 $\times 10^{-4}$             | CL=90% |
| $\Gamma_{13}$ $\phi\eta$                          | (3.1 $\pm$ 0.7) $\times 10^{-4}$ |        |
| $\Gamma_{14}$ $\omega\eta$                        | < 1.4 $\times 10^{-5}$           | CL=90% |
| $\Gamma_{15}$ $\rho^0\eta$                        | < 5 $\times 10^{-4}$             | CL=90% |
| $\Gamma_{16}$ $\phi\pi^0$                         | < 3 $\times 10^{-5}$             | CL=90% |
| $\Gamma_{17}$ $\omega\pi^0$                       | < 6 $\times 10^{-4}$             | CL=90% |
| $\Gamma_{18}$ $\pi^+\pi^-\pi^0$                   | < 5 $\times 10^{-6}$             | CL=90% |
| $\Gamma_{19}$ $\rho\pi$                           | < 5 $\times 10^{-6}$             | CL=90% |
| $\Gamma_{20}$ $K^*(892)^+K^- + \text{c.c.}$       | < 1.4 $\times 10^{-5}$           | CL=90% |
| $\Gamma_{21}$ $K^*(892)^0\bar{K}^0 + \text{c.c.}$ | < 1.2 $\times 10^{-3}$           | CL=90% |
| $\Gamma_{22}$ $K_S^0 K_L^0$                       | < 1.2 $\times 10^{-5}$           | CL=90% |
| $\Gamma_{23}$ $2(\pi^+\pi^-)$                     | < 1.12 $\times 10^{-3}$          | CL=90% |
| $\Gamma_{24}$ $2(\pi^+\pi^-)\pi^0$                | < 1.06 $\times 10^{-3}$          | CL=90% |
| $\Gamma_{25}$ $2(\pi^+\pi^-\pi^0)$                | < 5.85 %                         | CL=90% |
| $\Gamma_{26}$ $\omega\pi^+\pi^-$                  | < 6.0 $\times 10^{-4}$           | CL=90% |
| $\Gamma_{27}$ $3(\pi^+\pi^-)$                     | < 9.1 $\times 10^{-3}$           |        |
| $\Gamma_{28}$ $3(\pi^+\pi^-)\pi^0$                | < 1.37 %                         |        |
| $\Gamma_{29}$ $3(\pi^+\pi^-)2\pi^0$               | < 11.74 %                        | CL=90% |
| $\Gamma_{30}$ $\eta\pi^+\pi^-$                    | < 1.24 $\times 10^{-3}$          | CL=90% |
| $\Gamma_{31}$ $\pi^+\pi^-2\pi^0$                  | < 8.9 $\times 10^{-3}$           | CL=90% |
| $\Gamma_{32}$ $\rho^0\pi^+\pi^-$                  | < 6.9 $\times 10^{-3}$           | CL=90% |
| $\Gamma_{33}$ $\eta3\pi$                          | < 1.34 $\times 10^{-3}$          | CL=90% |
| $\Gamma_{34}$ $\eta2(\pi^+\pi^-)$                 | < 2.43 %                         |        |

|               |                                     |        |                  |        |
|---------------|-------------------------------------|--------|------------------|--------|
| $\Gamma_{35}$ | $\eta\rho^0\pi^+\pi^-$              | < 1.45 | %                | CL=90% |
| $\Gamma_{36}$ | $\eta'3\pi$                         | < 2.44 | $\times 10^{-3}$ | CL=90% |
| $\Gamma_{37}$ | $K^+K^-\pi^+\pi^-$                  | < 9.0  | $\times 10^{-4}$ | CL=90% |
| $\Gamma_{38}$ | $\phi\pi^+\pi^-$                    | < 4.1  | $\times 10^{-4}$ | CL=90% |
| $\Gamma_{39}$ | $K^+K^-2\pi^0$                      | < 4.2  | $\times 10^{-3}$ | CL=90% |
| $\Gamma_{40}$ | $4(\pi^+\pi^-)$                     | < 1.67 | %                | CL=90% |
| $\Gamma_{41}$ | $4(\pi^+\pi^-)\pi^0$                | < 3.06 | %                | CL=90% |
| $\Gamma_{42}$ | $\phi f_0(980)$                     | < 4.5  | $\times 10^{-4}$ | CL=90% |
| $\Gamma_{43}$ | $K^+K^-\pi^+\pi^-\pi^0$             | < 2.36 | $\times 10^{-3}$ | CL=90% |
| $\Gamma_{44}$ | $K^+K^-\rho^0\pi^0$                 | < 8    | $\times 10^{-4}$ | CL=90% |
| $\Gamma_{45}$ | $K^+K^-\rho^+\pi^-$                 | < 1.46 | %                | CL=90% |
| $\Gamma_{46}$ | $\omega K^+K^-$                     | < 3.4  | $\times 10^{-4}$ | CL=90% |
| $\Gamma_{47}$ | $\phi\pi^+\pi^-\pi^0$               | < 3.8  | $\times 10^{-3}$ | CL=90% |
| $\Gamma_{48}$ | $K^{*0}K^-\pi^+\pi^0 + \text{c.c.}$ | < 1.62 | %                | CL=90% |
| $\Gamma_{49}$ | $K^{*+}K^-\pi^+\pi^- + \text{c.c.}$ | < 3.23 | %                | CL=90% |
| $\Gamma_{50}$ | $K^+K^-\pi^+\pi^-2\pi^0$            | < 2.67 | %                | CL=90% |
| $\Gamma_{51}$ | $K^+K^-2(\pi^+\pi^-)$               | < 1.03 | %                | CL=90% |
| $\Gamma_{52}$ | $K^+K^-2(\pi^+\pi^-)\pi^0$          | < 3.60 | %                | CL=90% |
| $\Gamma_{53}$ | $\eta K^+K^-$                       | < 4.1  | $\times 10^{-4}$ | CL=90% |
| $\Gamma_{54}$ | $\eta K^+K^-\pi^+\pi^-$             | < 1.24 | %                | CL=90% |
| $\Gamma_{55}$ | $\rho^0 K^+K^-$                     | < 5.0  | $\times 10^{-3}$ | CL=90% |
| $\Gamma_{56}$ | $2(K^+K^-)$                         | < 6.0  | $\times 10^{-4}$ | CL=90% |
| $\Gamma_{57}$ | $\phi K^+K^-$                       | < 7.5  | $\times 10^{-4}$ | CL=90% |
| $\Gamma_{58}$ | $2(K^+K^-)\pi^0$                    | < 2.9  | $\times 10^{-4}$ | CL=90% |
| $\Gamma_{59}$ | $2(K^+K^-)\pi^+\pi^-$               | < 3.2  | $\times 10^{-3}$ | CL=90% |
| $\Gamma_{60}$ | $K_S^0 K^-\pi^+$                    | < 3.2  | $\times 10^{-3}$ | CL=90% |
| $\Gamma_{61}$ | $K_S^0 K^-\pi^+\pi^0$               | < 1.33 | %                | CL=90% |
| $\Gamma_{62}$ | $K_S^0 K^-\rho^+$                   | < 6.6  | $\times 10^{-3}$ | CL=90% |
| $\Gamma_{63}$ | $K_S^0 K^-\pi^+\pi^-$               | < 8.7  | $\times 10^{-3}$ | CL=90% |
| $\Gamma_{64}$ | $K_S^0 K^-\pi^+\rho^0$              | < 1.6  | %                | CL=90% |
| $\Gamma_{65}$ | $K_S^0 K^-\pi^+\eta$                | < 1.3  | %                | CL=90% |
| $\Gamma_{66}$ | $K_S^0 K^-\pi^+\pi^-\pi^0$          | < 4.18 | %                | CL=90% |
| $\Gamma_{67}$ | $K_S^0 K^-\pi^+\pi^-\eta$           | < 4.8  | %                | CL=90% |
| $\Gamma_{68}$ | $K_S^0 K^-\pi^+2(\pi^+\pi^-)$       | < 1.22 | %                | CL=90% |
| $\Gamma_{69}$ | $K_S^0 K^-\pi^+2\pi^0$              | < 2.65 | %                | CL=90% |
| $\Gamma_{70}$ | $K_S^0 K^-\pi^+K^-\pi^+$            | < 4.9  | $\times 10^{-3}$ | CL=90% |
| $\Gamma_{71}$ | $K_S^0 K^-\pi^+K^-\pi^+\pi^0$       | < 3.0  | %                | CL=90% |
| $\Gamma_{72}$ | $K_S^0 K^-\pi^+K^-\pi^+\eta$        | < 2.2  | %                | CL=90% |
| $\Gamma_{73}$ | $K^{*0}K^-\pi^+ + \text{c.c.}$      | < 9.7  | $\times 10^{-3}$ | CL=90% |
| $\Gamma_{74}$ | $\rho\bar{\rho}\pi^0$               | < 1.2  | $\times 10^{-3}$ |        |
| $\Gamma_{75}$ | $\rho\bar{\rho}\pi^+\pi^-$          | < 5.8  | $\times 10^{-4}$ | CL=90% |
| $\Gamma_{76}$ | $\Lambda\bar{\Lambda}$              | < 1.2  | $\times 10^{-4}$ | CL=90% |
| $\Gamma_{77}$ | $\rho\bar{\rho}\pi^+\pi^-\pi^0$     | < 1.85 | $\times 10^{-3}$ | CL=90% |

|               |                                  |         |                  |        |
|---------------|----------------------------------|---------|------------------|--------|
| $\Gamma_{78}$ | $\omega p\bar{p}$                | $< 2.9$ | $\times 10^{-4}$ | CL=90% |
| $\Gamma_{79}$ | $\Lambda\bar{\Lambda}\pi^0$      | $< 1.2$ | $\times 10^{-3}$ | CL=90% |
| $\Gamma_{80}$ | $\rho\bar{\rho}2(\pi^+\pi^-)$    | $< 2.6$ | $\times 10^{-3}$ | CL=90% |
| $\Gamma_{81}$ | $\eta p\bar{p}$                  | $< 5.4$ | $\times 10^{-4}$ | CL=90% |
| $\Gamma_{82}$ | $\eta p\bar{p}\pi^+\pi^-$        | $< 3.3$ | $\times 10^{-3}$ | CL=90% |
| $\Gamma_{83}$ | $\rho^0 p\bar{p}$                | $< 1.7$ | $\times 10^{-3}$ | CL=90% |
| $\Gamma_{84}$ | $\rho\bar{\rho}K^+K^-$           | $< 3.2$ | $\times 10^{-4}$ | CL=90% |
| $\Gamma_{85}$ | $\eta p\bar{p}K^+K^-$            | $< 6.9$ | $\times 10^{-3}$ | CL=90% |
| $\Gamma_{86}$ | $\pi^0 p\bar{p}K^+K^-$           | $< 1.2$ | $\times 10^{-3}$ | CL=90% |
| $\Gamma_{87}$ | $\phi p\bar{p}$                  | $< 1.3$ | $\times 10^{-4}$ | CL=90% |
| $\Gamma_{88}$ | $\Lambda\bar{\Lambda}\pi^+\pi^-$ | $< 2.5$ | $\times 10^{-4}$ | CL=90% |
| $\Gamma_{89}$ | $\Lambda\bar{p}K^+$              | $< 2.8$ | $\times 10^{-4}$ | CL=90% |
| $\Gamma_{90}$ | $\Lambda\bar{p}K^+\pi^+\pi^-$    | $< 6.3$ | $\times 10^{-4}$ | CL=90% |

### Radiative decays

|               |                   |                   |                  |        |
|---------------|-------------------|-------------------|------------------|--------|
| $\Gamma_{91}$ | $\gamma\chi_{c2}$ | $< 9$             | $\times 10^{-4}$ | CL=90% |
| $\Gamma_{92}$ | $\gamma\chi_{c1}$ | $( 2.9 \pm 0.6 )$ | $\times 10^{-3}$ |        |
| $\Gamma_{93}$ | $\gamma\chi_{c0}$ | $( 7.3 \pm 0.9 )$ | $\times 10^{-3}$ |        |
| $\Gamma_{94}$ | $\gamma\eta'$     | $< 1.8$           | $\times 10^{-4}$ | CL=90% |
| $\Gamma_{95}$ | $\gamma\eta$      | $< 1.5$           | $\times 10^{-4}$ | CL=90% |
| $\Gamma_{96}$ | $\gamma\pi^0$     | $< 2$             | $\times 10^{-4}$ | CL=90% |

### CONSTRAINED FIT INFORMATION

An overall fit to the total width, a partial width, and 3 branching ratios uses 23 measurements and one constraint to determine 5 parameters. The overall fit has a  $\chi^2 = 20.0$  for 19 degrees of freedom.

The following *off-diagonal* array elements are the correlation coefficients  $\langle \delta p_i \delta p_j \rangle / (\delta p_i \cdot \delta p_j)$ , in percent, from the fit to parameters  $p_i$ , including the branching fractions,  $x_i \equiv \Gamma_i / \Gamma_{\text{total}}$ . The fit constrains the  $x_i$  whose labels appear in this array to sum to one.

|          |  |       |       |       |
|----------|--|-------|-------|-------|
| $x_3$    |  | 98    |       |       |
| $x_8$    |  | 0     | 0     |       |
| $\Gamma$ |  | 0     | 0     | -44   |
|          |  | $x_2$ | $x_3$ | $x_8$ |

|            | Mode           | Rate (MeV)                         | Scale factor |
|------------|----------------|------------------------------------|--------------|
| $\Gamma_2$ | $D^0\bar{D}^0$ | $14.1 \pm 1.4$                     | 1.7          |
| $\Gamma_3$ | $D^+D^-$       | $11.2 \pm 1.1$                     | 1.7          |
| $\Gamma_8$ | $e^+e^-$       | $( 2.62 \pm 0.18 ) \times 10^{-4}$ | 1.4          |

## $\psi(3770)$ PARTIAL WIDTHS

| $\Gamma(e^+e^-)$  |                    |                                     |      |         | $\Gamma_8$                    |  |
|---|--------------------|-------------------------------------|------|---------|-------------------------------|--|
| VALUE (keV)   | EVTS               | DOCUMENT ID                         | TECN | COMMENT |                               |  |
| <b>0.262 ± 0.018</b>  | <b>OUR FIT</b>     | Error includes scale factor of 1.4. |      |         |                               |  |
| <b>0.256 ± 0.016</b>  | <b>OUR AVERAGE</b> | Error includes scale factor of 1.2. |      |         |                               |  |
| 0.154 <sup>+0.079</sup> <sub>-0.058</sub> ± 0.021 <sub>-0.027</sub>   |                    | 9,10 ANASHIN                        | 12A  | KEDR    | $e^+e^- \rightarrow D\bar{D}$ |  |
| 0.22 ± 0.05   |                    | 11,12 ABLIKIM                       | 08D  | BES2    | $e^+e^- \rightarrow$ hadrons  |  |
| 0.277 ± 0.011 ± 0.013   |                    | 12 ABLIKIM                          | 07E  | BES2    | $e^+e^- \rightarrow$ hadrons  |  |
| 0.203 ± 0.003 <sup>+0.041</sup> <sub>-0.027</sub>   | 1.4M               | 12,13 BESSON                        | 06   | CLEO    | $e^+e^- \rightarrow$ hadrons  |  |
| 0.276 ± 0.050   |                    | 12 SCHINDLER                        | 80   | MRK2    | $e^+e^-$                      |  |
| 0.18 ± 0.06   |                    | 12 BACINO                           | 78   | DLCO    | $e^+e^-$                      |  |
| ● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●   |                    |                                     |      |         |                               |  |
| 0.414 <sup>+0.072</sup> <sub>-0.080</sub> ± 0.093 <sub>-0.028</sub>   |                    | 10,14 ANASHIN                       | 12A  | KEDR    | $e^+e^- \rightarrow D\bar{D}$ |  |
| 0.37 ± 0.09   |                    | 15 RAPIDIS                          | 77   | LGW     | $e^+e^-$                      |  |
| <sup>9</sup> Solution I of the two solutions.   |                    |                                     |      |         |                               |  |
| <sup>10</sup> Taking into account interference between the resonant and non-resonant $D\bar{D}$ production.   |                    |                                     |      |         |                               |  |
| <sup>11</sup> Reanalysis of data presented in BAI 02C. From a global fit over the center-of-mass energy region 3.7–5.0 GeV covering the $\psi(3770)$ , $\psi(4040)$ , $\psi(4160)$ , and $\psi(4415)$ resonances. Phase angle fixed in the fit to $\delta = 0^\circ$ .  |                    |                                     |      |         |                               |  |
| <sup>12</sup> Interference between the resonant and non-resonant $D\bar{D}$ production not taken into account.  |                    |                                     |      |         |                               |  |
| <sup>13</sup> BESSON 06 (as corrected in BESSON 10) measure $\sigma(e^+e^- \rightarrow \psi(3770) \rightarrow$ hadrons) = $6.36 \pm 0.08^{+0.41}_{-0.30}$ nb at $\sqrt{s} = 3773 \pm 1$ MeV, and obtain $\Gamma_{ee}$ from the Born-level cross section calculated using $\psi(3770)$ mass and width from our 2004 edition, PDG 04. |                    |                                     |      |         |                               |  |
| <sup>14</sup> Solution II of the two solutions.   |                    |                                     |      |         |                               |  |
| <sup>15</sup> See also $\Gamma(e^+e^-)/\Gamma_{\text{total}}$ below.  |                    |                                     |      |         |                               |  |

## $\psi(3770)$ BRANCHING RATIOS

| $\Gamma(D\bar{D})/\Gamma_{\text{total}}$                                      |                    |                                     |      |         | $\Gamma_1/\Gamma = (\Gamma_2 + \Gamma_3)/\Gamma$ |  |
|---|--------------------|-------------------------------------|------|---------|--|--|
| VALUE   | EVTS               | DOCUMENT ID                         | TECN | COMMENT |  |  |
| <b>0.93<sup>+0.08</sup><sub>-0.09</sub></b>                                   | <b>OUR FIT</b>     | Error includes scale factor of 2.0. |      |         |  |  |
| <b>0.93<sup>+0.08</sup><sub>-0.09</sub></b>                                   | <b>OUR AVERAGE</b> | Error includes scale factor of 2.1. |      |         |  |  |
| 0.849 ± 0.056 ± 0.018   |                    | 16 ABLIKIM                          | 08B  | BES2    | $e^+e^- \rightarrow$ non- $D\bar{D}$             |  |
| 1.033 ± 0.014 <sup>+0.048</sup> <sub>-0.066</sub>                             | 1.427M             | 17 BESSON                           | 06   | CLEO    | $e^+e^- \rightarrow$ hadrons                     |  |
| ● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ● |                    |                                     |      |         |  |  |
| 0.866 ± 0.050 ± 0.036   |                    | 18,19 ABLIKIM                       | 07K  | BES2    | $e^+e^- \rightarrow$ non- $D\bar{D}$             |  |
| 0.836 ± 0.073 ± 0.042   |                    | 19 ABLIKIM                          | 06L  | BES2    | $e^+e^- \rightarrow D\bar{D}$                    |  |
| 0.855 ± 0.017 ± 0.058   |                    | 19,20 ABLIKIM                       | 06N  | BES2    | $e^+e^- \rightarrow D\bar{D}$                    |  |

$\Gamma(D^0\bar{D}^0)/\Gamma_{\text{total}}$   $\Gamma_2/\Gamma$

VALUE DOCUMENT ID TECN COMMENT

**0.52 ± 0.05 OUR FIT** Error includes scale factor of 2.0.

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

|                       |                       |     |      |                                   |
|-----------------------|-----------------------|-----|------|-----------------------------------|
| 0.467 ± 0.047 ± 0.023 | ABLIKIM               | 06L | BES2 | $e^+e^- \rightarrow D^0\bar{D}^0$ |
| 0.499 ± 0.013 ± 0.038 | <sup>20</sup> ABLIKIM | 06N | BES2 | $e^+e^- \rightarrow D^0\bar{D}^0$ |

$\Gamma(D^+D^-)/\Gamma_{\text{total}}$   $\Gamma_3/\Gamma$

VALUE DOCUMENT ID TECN COMMENT

**0.41 ± 0.04 OUR FIT** Error includes scale factor of 2.0.

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

|                       |                       |     |      |                             |
|-----------------------|-----------------------|-----|------|-----------------------------|
| 0.369 ± 0.037 ± 0.028 | ABLIKIM               | 06L | BES2 | $e^+e^- \rightarrow D^+D^-$ |
| 0.357 ± 0.011 ± 0.034 | <sup>20</sup> ABLIKIM | 06N | BES2 | $e^+e^- \rightarrow D^+D^-$ |

$\Gamma(D^0\bar{D}^0)/\Gamma(D^+D^-)$   $\Gamma_2/\Gamma_3$

VALUE EVTS DOCUMENT ID TECN COMMENT

**1.260 ± 0.021 OUR FIT**

**1.260 ± 0.021 OUR AVERAGE**

|                       |                                     |      |      |  |
|-----------------------|-------------------------------------|------|------|--|
| 1.39 ± 0.31 ± 0.12    | PAKHLOVA                            | 08   | BELL | 10.6 $e^+e^- \rightarrow D\bar{D}\gamma$ |
| 1.78 ± 0.33 ± 0.24    | AUBERT                              | 07BE | BABR | $e^+e^- \rightarrow D\bar{D}\gamma$      |
| 1.258 ± 0.016 ± 0.014 | DOBBS                               | 07   | CLEO | $e^+e^- \rightarrow D\bar{D}$            |
| 1.27 ± 0.12 ± 0.08    | ABLIKIM                             | 06L  | BES2 | $e^+e^- \rightarrow D\bar{D}$            |
| 2.43 ± 1.50 ± 0.43    | <sup>34</sup> <sup>21</sup> CHISTOV | 04   | BELL | $B^+ \rightarrow \psi(3770)K^+$          |

$\Gamma(J/\psi\pi^+\pi^-)/\Gamma_{\text{total}}$   $\Gamma_4/\Gamma$

VALUE (units 10<sup>-3</sup>) EVTS DOCUMENT ID TECN COMMENT

**1.93 ± 0.28 OUR AVERAGE**

|                    |            |      |    |      |                                 |
|--------------------|------------|------|----|------|---------------------------------|
| 1.89 ± 0.20 ± 0.20 | 231 ± 33   | ADAM | 06 | CLEO | $e^+e^- \rightarrow \psi(3770)$ |
| 3.4 ± 1.4 ± 0.9    | 17.8 ± 4.8 | BAI  | 05 | BES2 | $e^+e^- \rightarrow \psi(3770)$ |

$\Gamma(J/\psi\pi^0\pi^0)/\Gamma_{\text{total}}$   $\Gamma_5/\Gamma$

VALUE (units 10<sup>-2</sup>) EVTS DOCUMENT ID TECN COMMENT

|                              |         |      |    |      |                                 |
|------------------------------|---------|------|----|------|---------------------------------|
| <b>0.080 ± 0.025 ± 0.016</b> | 39 ± 14 | ADAM | 06 | CLEO | $e^+e^- \rightarrow \psi(3770)$ |
|------------------------------|---------|------|----|------|---------------------------------|

$\Gamma(J/\psi\eta)/\Gamma_{\text{total}}$   $\Gamma_6/\Gamma$

VALUE (units 10<sup>-5</sup>) EVTS DOCUMENT ID TECN COMMENT

|                     |         |      |    |      |                                 |
|---------------------|---------|------|----|------|---------------------------------|
| <b>87 ± 33 ± 22</b> | 22 ± 10 | ADAM | 06 | CLEO | $e^+e^- \rightarrow \psi(3770)$ |
|---------------------|---------|------|----|------|---------------------------------|

$\Gamma(J/\psi\pi^0)/\Gamma_{\text{total}}$   $\Gamma_7/\Gamma$

VALUE (units 10<sup>-5</sup>) CL% EVTS DOCUMENT ID TECN COMMENT

|               |    |     |      |    |      |                                 |
|---------------|----|-----|------|----|------|---------------------------------|
| <b>&lt;28</b> | 90 | <10 | ADAM | 06 | CLEO | $e^+e^- \rightarrow \psi(3770)$ |
|---------------|----|-----|------|----|------|---------------------------------|

$\Gamma(e^+e^-)/\Gamma_{\text{total}}$   $\Gamma_8/\Gamma$

VALUE (units 10<sup>-5</sup>) DOCUMENT ID TECN COMMENT

**0.96 ± 0.07 OUR FIT** Error includes scale factor of 1.3.

|                  |         |    |     |          |
|------------------|---------|----|-----|----------|
| <b>1.3 ± 0.2</b> | RAPIDIS | 77 | LGW | $e^+e^-$ |
|------------------|---------|----|-----|----------|

<sup>16</sup> Neglecting interference.

<sup>17</sup> Obtained by comparing a measurement of the total cross section (corrected in BESSON 10) with that of  $D\bar{D}$  reported by CLEO in DOBBS 07.

<sup>18</sup> Using  $\sigma^{obs} = 7.07 \pm 0.58$  nb and neglecting interference.

<sup>19</sup> Not independent of ABLIKIM 08B.

<sup>20</sup> From a measurement of  $\sigma(e^+e^- \rightarrow D\bar{D})$  at  $\sqrt{s} = 3773$  MeV, using the  $\psi(3770)$  resonance parameters measured by ABLIKIM 06L.

<sup>21</sup> See ADLER 88C for older measurements of this quantity.

## ————— DECAYS TO LIGHT HADRONS —————

### $\Gamma(b_1(1235)\pi)/\Gamma_{total}$ $\Gamma_9/\Gamma$

| VALUE (units $10^{-5}$ ) | CL% | DOCUMENT ID         | TECN | COMMENT                              |
|--------------------------|-----|---------------------|------|--------------------------------------|
| <b>&lt;1.4</b>           | 90  | <sup>22</sup> ADAMS | 06   | CLEO $e^+e^- \rightarrow \psi(3770)$ |

### $\Gamma(\phi\eta')/\Gamma_{total}$ $\Gamma_{10}/\Gamma$

| VALUE (units $10^{-4}$ ) | CL% | DOCUMENT ID         | TECN | COMMENT                              |
|--------------------------|-----|---------------------|------|--------------------------------------|
| <b>&lt;7</b>             | 90  | <sup>22</sup> ADAMS | 06   | CLEO $e^+e^- \rightarrow \psi(3770)$ |

### $\Gamma(\omega\eta')/\Gamma_{total}$ $\Gamma_{11}/\Gamma$

| VALUE (units $10^{-4}$ ) | CL% | DOCUMENT ID         | TECN | COMMENT                              |
|--------------------------|-----|---------------------|------|--------------------------------------|
| <b>&lt;4</b>             | 90  | <sup>22</sup> ADAMS | 06   | CLEO $e^+e^- \rightarrow \psi(3770)$ |

### $\Gamma(\rho^0\eta')/\Gamma_{total}$ $\Gamma_{12}/\Gamma$

| VALUE (units $10^{-4}$ ) | CL% | DOCUMENT ID         | TECN | COMMENT                              |
|--------------------------|-----|---------------------|------|--------------------------------------|
| <b>&lt;6</b>             | 90  | <sup>22</sup> ADAMS | 06   | CLEO $e^+e^- \rightarrow \psi(3770)$ |

### $\Gamma(\phi\eta)/\Gamma_{total}$ $\Gamma_{13}/\Gamma$

| VALUE (units $10^{-4}$ )                | DOCUMENT ID         | TECN | COMMENT                                  |
|---|---------------------|------|--|
| <b><math>3.1 \pm 0.6 \pm 0.3</math></b> | <sup>22</sup> ADAMS | 06   | CLEO $3.773 e^+e^- \rightarrow \phi\eta$ |

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

|               |                       |     |                                      |
|---------------|-----------------------|-----|--------------------------------------|
| <b>&lt;19</b> | <sup>23</sup> ABLIKIM | 07B | BES2 $e^+e^- \rightarrow \psi(3770)$ |
|---------------|-----------------------|-----|--------------------------------------|

### $\Gamma(\omega\eta)/\Gamma_{total}$ $\Gamma_{14}/\Gamma$

| VALUE (units $10^{-5}$ ) | CL% | DOCUMENT ID         | TECN | COMMENT                              |
|--------------------------|-----|---------------------|------|--------------------------------------|
| <b>&lt;1.4</b>           | 90  | <sup>22</sup> ADAMS | 06   | CLEO $e^+e^- \rightarrow \psi(3770)$ |

### $\Gamma(\rho^0\eta)/\Gamma_{total}$ $\Gamma_{15}/\Gamma$

| VALUE (units $10^{-4}$ ) | CL% | DOCUMENT ID         | TECN | COMMENT                              |
|--------------------------|-----|---------------------|------|--------------------------------------|
| <b>&lt;5</b>             | 90  | <sup>22</sup> ADAMS | 06   | CLEO $e^+e^- \rightarrow \psi(3770)$ |

### $\Gamma(\phi\pi^0)/\Gamma_{total}$ $\Gamma_{16}/\Gamma$

| VALUE (units $10^{-5}$ ) | CL% | DOCUMENT ID         | TECN | COMMENT                              |
|--------------------------|-----|---------------------|------|--------------------------------------|
| <b>&lt; 3</b>            | 90  | <sup>22</sup> ADAMS | 06   | CLEO $e^+e^- \rightarrow \psi(3770)$ |

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

|               |                       |     |                                      |
|---------------|-----------------------|-----|--------------------------------------|
| <b>&lt;50</b> | <sup>23</sup> ABLIKIM | 07B | BES2 $e^+e^- \rightarrow \psi(3770)$ |
|---------------|-----------------------|-----|--------------------------------------|



**$\Gamma(\omega\pi^0)/\Gamma_{\text{total}}$   $\Gamma_{17}/\Gamma$**

| <u>VALUE (units <math>10^{-4}</math>)</u> | <u>CL%</u> |    | <u>DOCUMENT ID</u> | <u>TECN</u> | <u>COMMENT</u>                       |
|---|------------|----|--------------------|-------------|--------------------------------------|
| <6  | 90         | 22 | ADAMS              | 06          | CLEO $e^+e^- \rightarrow \psi(3770)$ |

**$\Gamma(\pi^+\pi^-\pi^0)/\Gamma_{\text{total}}$   $\Gamma_{18}/\Gamma$**

| <u>VALUE (units <math>10^{-6}</math>)</u> | <u>CL%</u> |       | <u>DOCUMENT ID</u> | <u>TECN</u> | <u>COMMENT</u>                       |
|---|------------|-------|--------------------|-------------|--------------------------------------|
| <5  | 90         | 22,24 | ADAMS              | 06          | CLEO $e^+e^- \rightarrow \psi(3770)$ |

**$\Gamma(\rho\pi)/\Gamma_{\text{total}}$   $\Gamma_{19}/\Gamma$**

| <u>VALUE (units <math>10^{-6}</math>)</u> | <u>CL%</u> |       | <u>DOCUMENT ID</u> | <u>TECN</u> | <u>COMMENT</u>                       |
|---|------------|-------|--------------------|-------------|--------------------------------------|
| <5  | 90         | 22,24 | ADAMS              | 06          | CLEO $e^+e^- \rightarrow \psi(3770)$ |

**$\Gamma(K^*(892)^+K^- + \text{c.c.})/\Gamma_{\text{total}}$   $\Gamma_{20}/\Gamma$**

| <u>VALUE (units <math>10^{-5}</math>)</u> | <u>CL%</u> |    | <u>DOCUMENT ID</u> | <u>TECN</u> | <u>COMMENT</u>                       |
|---|------------|----|--------------------|-------------|--------------------------------------|
| <1.4                                      | 90         | 22 | ADAMS              | 06          | CLEO $e^+e^- \rightarrow \psi(3770)$ |

**$\Gamma(K^*(892)^0\bar{K}^0 + \text{c.c.})/\Gamma_{\text{total}}$   $\Gamma_{21}/\Gamma$**

| <u>VALUE (units <math>10^{-3}</math>)</u> | <u>CL%</u> |    | <u>DOCUMENT ID</u> | <u>TECN</u> | <u>COMMENT</u>                       |
|---|------------|----|--------------------|-------------|--------------------------------------|
| <1.2                                      | 90         | 22 | ADAMS              | 06          | CLEO $e^+e^- \rightarrow \psi(3770)$ |

**$\Gamma(K_S^0 K_L^0)/\Gamma_{\text{total}}$   $\Gamma_{22}/\Gamma$**

| <u>VALUE (units <math>10^{-5}</math>)</u> | <u>CL%</u> |    | <u>DOCUMENT ID</u> | <u>TECN</u> | <u>COMMENT</u>                  |
|---|------------|----|--------------------|-------------|---------------------------------|
| < 1.2                                     | 90         | 25 | CRONIN-HEN..06     | CLEO        | $e^+e^- \rightarrow \psi(3770)$ |

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

|     |    |    |         |     |                                     |
|-----|----|----|---------|-----|-------------------------------------|
| <21 | 90 | 26 | ABLIKIM | 04F | BES $e^+e^- \rightarrow \psi(3770)$ |
|-----|----|----|---------|-----|-------------------------------------|

**$\Gamma(2(\pi^+\pi^-))/\Gamma_{\text{total}}$   $\Gamma_{23}/\Gamma$**

| <u>VALUE (units <math>10^{-4}</math>)</u> | <u>CL%</u> |    | <u>DOCUMENT ID</u> | <u>TECN</u> | <u>COMMENT</u>                       |
|---|------------|----|--------------------|-------------|--------------------------------------|
| <11.2                                     | 90         | 27 | HUANG              | 06A         | CLEO $e^+e^- \rightarrow \psi(3770)$ |

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

|     |  |    |         |     |                                      |
|-----|--|----|---------|-----|--------------------------------------|
| <48 |  | 23 | ABLIKIM | 07B | BES2 $e^+e^- \rightarrow \psi(3770)$ |
|-----|--|----|---------|-----|--------------------------------------|

**$\Gamma(2(\pi^+\pi^-\pi^0))/\Gamma_{\text{total}}$   $\Gamma_{24}/\Gamma$**

| <u>VALUE (units <math>10^{-4}</math>)</u> | <u>CL%</u> |    | <u>DOCUMENT ID</u> | <u>TECN</u> | <u>COMMENT</u>                       |
|---|------------|----|--------------------|-------------|--------------------------------------|
| <10.6                                     | 90         | 27 | HUANG              | 06A         | CLEO $e^+e^- \rightarrow \psi(3770)$ |

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

|     |  |    |         |     |                                      |
|-----|--|----|---------|-----|--------------------------------------|
| <62 |  | 23 | ABLIKIM | 07B | BES2 $e^+e^- \rightarrow \psi(3770)$ |
|-----|--|----|---------|-----|--------------------------------------|

**$\Gamma(2(\pi^+\pi^-\pi^0))/\Gamma_{\text{total}}$   $\Gamma_{25}/\Gamma$**

| <u>VALUE (units <math>10^{-3}</math>)</u> | <u>CL%</u> | <u>EVTS</u> | <u>DOCUMENT ID</u> | <u>TECN</u> | <u>COMMENT</u>                       |
|---|------------|-------------|--------------------|-------------|--------------------------------------|
| <58.5                                     | 90         | 305         | ABLIKIM            | 08N         | BES2 $e^+e^- \rightarrow \psi(3770)$ |

**$\Gamma(\omega\pi^+\pi^-)/\Gamma_{\text{total}}$**   **$\Gamma_{26}/\Gamma$**

| <u>VALUE (units <math>10^{-4}</math>)</u>                                     | <u>CL%</u> |    | <u>DOCUMENT ID</u> | <u>TECN</u> | <u>COMMENT</u>                       |
|---|------------|----|--------------------|-------------|--------------------------------------|
| <b>&lt; 6.0</b>   | 90         | 27 | HUANG              | 06A         | CLEO $e^+e^- \rightarrow \psi(3770)$ |
| • • • We do not use the following data for averages, fits, limits, etc. • • • |            |    |                    |             |                                      |
| <55   | 90         | 23 | ABLIKIM            | 07I         | BES2 $3.77 e^+e^-$                   |

**$\Gamma(3(\pi^+\pi^-))/\Gamma_{\text{total}}$**   **$\Gamma_{27}/\Gamma$**

| <u>VALUE (units <math>10^{-4}</math>)</u> |  |    | <u>DOCUMENT ID</u> | <u>TECN</u> | <u>COMMENT</u>                       |
|---|--|----|--------------------|-------------|--------------------------------------|
| <b>&lt;91</b>                             |  | 23 | ABLIKIM            | 07B         | BES2 $e^+e^- \rightarrow \psi(3770)$ |

**$\Gamma(3(\pi^+\pi^-\pi^0))/\Gamma_{\text{total}}$**   **$\Gamma_{28}/\Gamma$**

| <u>VALUE (units <math>10^{-4}</math>)</u> |  |    | <u>DOCUMENT ID</u> | <u>TECN</u> | <u>COMMENT</u>                       |
|---|--|----|--------------------|-------------|--------------------------------------|
| <b>&lt;137</b>                            |  | 23 | ABLIKIM            | 07B         | BES2 $e^+e^- \rightarrow \psi(3770)$ |

**$\Gamma(3(\pi^+\pi^-)2\pi^0)/\Gamma_{\text{total}}$**   **$\Gamma_{29}/\Gamma$**

| <u>VALUE (units <math>10^{-3}</math>)</u> | <u>CL%</u> | <u>EVTS</u> | <u>DOCUMENT ID</u> | <u>TECN</u> | <u>COMMENT</u>                       |
|---|------------|-------------|--------------------|-------------|--------------------------------------|
| <b>&lt;117.4</b>                          | 90         | 59          | ABLIKIM            | 08N         | BES2 $e^+e^- \rightarrow \psi(3770)$ |

**$\Gamma(\eta\pi^+\pi^-)/\Gamma_{\text{total}}$**   **$\Gamma_{30}/\Gamma$**

| <u>VALUE (units <math>10^{-3}</math>)</u>                                     | <u>CL%</u> |    | <u>DOCUMENT ID</u> | <u>TECN</u> | <u>COMMENT</u>                       |
|---|------------|----|--------------------|-------------|--------------------------------------|
| <b>&lt;1.24</b>   | 90         | 27 | HUANG              | 06A         | CLEO $e^+e^- \rightarrow \psi(3770)$ |
| • • • We do not use the following data for averages, fits, limits, etc. • • • |            |    |                    |             |                                      |
| <2.3  | 90         | 23 | ABLIKIM            | 10D         | BES2 $e^+e^- \rightarrow \psi(3770)$ |

**$\Gamma(\pi^+\pi^-2\pi^0)/\Gamma_{\text{total}}$**   **$\Gamma_{31}/\Gamma$**

| <u>VALUE (units <math>10^{-3}</math>)</u> | <u>CL%</u> | <u>EVTS</u> | <u>DOCUMENT ID</u> | <u>TECN</u> | <u>COMMENT</u>                       |
|---|------------|-------------|--------------------|-------------|--------------------------------------|
| <b>&lt;8.9</b>                            | 90         | 218         | ABLIKIM            | 08N         | BES2 $e^+e^- \rightarrow \psi(3770)$ |

**$\Gamma(\rho^0\pi^+\pi^-)/\Gamma_{\text{total}}$**   **$\Gamma_{32}/\Gamma$**

| <u>VALUE (units <math>10^{-3}</math>)</u> | <u>CL%</u> |    | <u>DOCUMENT ID</u> | <u>TECN</u> | <u>COMMENT</u>                       |
|---|------------|----|--------------------|-------------|--------------------------------------|
| <b>&lt;6.9</b>                            | 90         | 23 | ABLIKIM            | 07F         | BES2 $e^+e^- \rightarrow \psi(3770)$ |

**$\Gamma(\eta3\pi)/\Gamma_{\text{total}}$**   **$\Gamma_{33}/\Gamma$**

| <u>VALUE (units <math>10^{-4}</math>)</u> | <u>CL%</u> |    | <u>DOCUMENT ID</u> | <u>TECN</u> | <u>COMMENT</u>                       |
|---|------------|----|--------------------|-------------|--------------------------------------|
| <b>&lt;13.4</b>                           | 90         | 27 | HUANG              | 06A         | CLEO $e^+e^- \rightarrow \psi(3770)$ |

**$\Gamma(\eta2(\pi^+\pi^-))/\Gamma_{\text{total}}$**   **$\Gamma_{34}/\Gamma$**

| <u>VALUE (units <math>10^{-4}</math>)</u> |  |    | <u>DOCUMENT ID</u> | <u>TECN</u> | <u>COMMENT</u>                       |
|---|--|----|--------------------|-------------|--------------------------------------|
| <b>&lt;243</b>                            |  | 23 | ABLIKIM            | 07B         | BES2 $e^+e^- \rightarrow \psi(3770)$ |

**$\Gamma(\eta\rho^0\pi^+\pi^-)/\Gamma_{\text{total}}$**   **$\Gamma_{35}/\Gamma$**

| <u>VALUE (units <math>10^{-2}</math>)</u> | <u>CL%</u> |    | <u>DOCUMENT ID</u> | <u>TECN</u> | <u>COMMENT</u>                       |
|---|------------|----|--------------------|-------------|--------------------------------------|
| <b>&lt;1.45</b>                           | 90         | 23 | ABLIKIM            | 10D         | BES2 $e^+e^- \rightarrow \psi(3770)$ |

|   |            |             |                    |             |  |
|---|------------|-------------|--------------------|-------------|--|
| <b><math>\Gamma(\eta' 3\pi)/\Gamma_{\text{total}}</math></b>                  |            |             |                    |             | <b><math>\Gamma_{36}/\Gamma</math></b> |
| <u>VALUE (units <math>10^{-4}</math>)</u>                                     | <u>CL%</u> |             | <u>DOCUMENT ID</u> | <u>TECN</u> | <u>COMMENT</u>                         |
| <b>&lt;24.4</b>   | 90         | 27          | HUANG              | 06A         | CLEO $e^+ e^- \rightarrow \psi(3770)$  |
| <b><math>\Gamma(K^+ K^- \pi^+ \pi^-)/\Gamma_{\text{total}}</math></b>         |            |             |                    |             | <b><math>\Gamma_{37}/\Gamma</math></b> |
| <u>VALUE (units <math>10^{-4}</math>)</u>                                     | <u>CL%</u> |             | <u>DOCUMENT ID</u> | <u>TECN</u> | <u>COMMENT</u>                         |
| <b>&lt; 9.0</b>   | 90         | 27          | HUANG              | 06A         | CLEO $e^+ e^- \rightarrow \psi(3770)$  |
| • • • We do not use the following data for averages, fits, limits, etc. • • • |            |             |                    |             |  |
| <48   |            | 23          | ABLIKIM            | 07B         | BES2 $e^+ e^- \rightarrow \psi(3770)$  |
| <b><math>\Gamma(\phi \pi^+ \pi^-)/\Gamma_{\text{total}}</math></b>            |            |             |                    |             | <b><math>\Gamma_{38}/\Gamma</math></b> |
| <u>VALUE (units <math>10^{-4}</math>)</u>                                     | <u>CL%</u> |             | <u>DOCUMENT ID</u> | <u>TECN</u> | <u>COMMENT</u>                         |
| <b>&lt; 4.1</b>   | 90         | 27          | HUANG              | 06A         | CLEO $e^+ e^- \rightarrow \psi(3770)$  |
| • • • We do not use the following data for averages, fits, limits, etc. • • • |            |             |                    |             |  |
| <16   |            | 23          | ABLIKIM            | 07B         | BES2 $e^+ e^- \rightarrow \psi(3770)$  |
| <b><math>\Gamma(K^+ K^- 2\pi^0)/\Gamma_{\text{total}}</math></b>              |            |             |                    |             | <b><math>\Gamma_{39}/\Gamma</math></b> |
| <u>VALUE (units <math>10^{-3}</math>)</u>                                     | <u>CL%</u> | <u>EVTS</u> | <u>DOCUMENT ID</u> | <u>TECN</u> | <u>COMMENT</u>                         |
| <b>&lt;4.2</b>  | 90         | 14          | ABLIKIM            | 08N         | BES2 $e^+ e^- \rightarrow \psi(3770)$  |
| <b><math>\Gamma(4(\pi^+ \pi^-))/\Gamma_{\text{total}}</math></b>              |            |             |                    |             | <b><math>\Gamma_{40}/\Gamma</math></b> |
| <u>VALUE (units <math>10^{-3}</math>)</u>                                     | <u>CL%</u> |             | <u>DOCUMENT ID</u> | <u>TECN</u> | <u>COMMENT</u>                         |
| <b>&lt;16.7</b>   | 90         | 23          | ABLIKIM            | 07F         | BES2 $e^+ e^- \rightarrow \psi(3770)$  |
| <b><math>\Gamma(4(\pi^+ \pi^-) \pi^0)/\Gamma_{\text{total}}</math></b>        |            |             |                    |             | <b><math>\Gamma_{41}/\Gamma</math></b> |
| <u>VALUE (units <math>10^{-3}</math>)</u>                                     | <u>CL%</u> |             | <u>DOCUMENT ID</u> | <u>TECN</u> | <u>COMMENT</u>                         |
| <b>&lt;30.6</b>   | 90         | 23          | ABLIKIM            | 07F         | BES2 $e^+ e^- \rightarrow \psi(3770)$  |
| <b><math>\Gamma(\phi f_0(980))/\Gamma_{\text{total}}</math></b>               |            |             |                    |             | <b><math>\Gamma_{42}/\Gamma</math></b> |
| <u>VALUE (units <math>10^{-4}</math>)</u>                                     | <u>CL%</u> |             | <u>DOCUMENT ID</u> | <u>TECN</u> | <u>COMMENT</u>                         |
| <b>&lt;4.5</b>  | 90         | 27          | HUANG              | 06A         | CLEO $e^+ e^- \rightarrow \psi(3770)$  |
| <b><math>\Gamma(K^+ K^- \pi^+ \pi^- \pi^0)/\Gamma_{\text{total}}</math></b>   |            |             |                    |             | <b><math>\Gamma_{43}/\Gamma</math></b> |
| <u>VALUE (units <math>10^{-4}</math>)</u>                                     | <u>CL%</u> |             | <u>DOCUMENT ID</u> | <u>TECN</u> | <u>COMMENT</u>                         |
| <b>&lt; 23.6</b>  | 90         | 27          | HUANG              | 06A         | CLEO $e^+ e^- \rightarrow \psi(3770)$  |
| • • • We do not use the following data for averages, fits, limits, etc. • • • |            |             |                    |             |  |
| <111  |            | 23          | ABLIKIM            | 07B         | BES2 $e^+ e^- \rightarrow \psi(3770)$  |
| <b><math>\Gamma(K^+ K^- \rho^0 \pi^0)/\Gamma_{\text{total}}</math></b>        |            |             |                    |             | <b><math>\Gamma_{44}/\Gamma</math></b> |
| <u>VALUE (units <math>10^{-4}</math>)</u>                                     | <u>CL%</u> |             | <u>DOCUMENT ID</u> | <u>TECN</u> | <u>COMMENT</u>                         |
| <b>&lt;8</b>  | 90         | 23          | ABLIKIM            | 07I         | BES2 $3.77 e^+ e^-$                    |
| <b><math>\Gamma(K^+ K^- \rho^+ \pi^-)/\Gamma_{\text{total}}</math></b>        |            |             |                    |             | <b><math>\Gamma_{45}/\Gamma</math></b> |
| <u>VALUE (units <math>10^{-4}</math>)</u>                                     | <u>CL%</u> |             | <u>DOCUMENT ID</u> | <u>TECN</u> | <u>COMMENT</u>                         |
| <b>&lt;146</b>  | 90         | 23          | ABLIKIM            | 07I         | BES2 $3.77 e^+ e^-$                    |

$\Gamma(\omega K^+ K^-)/\Gamma_{\text{total}}$   $\Gamma_{46}/\Gamma$

| VALUE (units $10^{-4}$ )  | CL% | DOCUMENT ID           | TECN | COMMENT                               |
|---|-----|-----------------------|------|---------------------------------------|
| <b>&lt; 3.4</b>   | 90  | <sup>27</sup> HUANG   | 06A  | CLEO $e^+ e^- \rightarrow \psi(3770)$ |
| • • • We do not use the following data for averages, fits, limits, etc. • • • |     |                       |      |                                       |
| <66   | 90  | <sup>23</sup> ABLIKIM | 07I  | BES2 $e^+ e^-$                        |

$\Gamma(\phi \pi^+ \pi^- \pi^0)/\Gamma_{\text{total}}$   $\Gamma_{47}/\Gamma$

| VALUE (units $10^{-4}$ ) | CL% | DOCUMENT ID           | TECN | COMMENT        |
|--------------------------|-----|-----------------------|------|----------------|
| <b>&lt;38</b>            | 90  | <sup>23</sup> ABLIKIM | 07I  | BES2 $e^+ e^-$ |

$\Gamma(K^{*0} K^- \pi^+ \pi^0 + \text{c.c.})/\Gamma_{\text{total}}$   $\Gamma_{48}/\Gamma$

| VALUE (units $10^{-4}$ ) | CL% | DOCUMENT ID           | TECN | COMMENT        |
|--------------------------|-----|-----------------------|------|----------------|
| <b>&lt;162</b>           | 90  | <sup>23</sup> ABLIKIM | 07I  | BES2 $e^+ e^-$ |

$\Gamma(K^{*+} K^- \pi^+ \pi^- + \text{c.c.})/\Gamma_{\text{total}}$   $\Gamma_{49}/\Gamma$

| VALUE (units $10^{-4}$ ) | CL% | DOCUMENT ID           | TECN | COMMENT        |
|--------------------------|-----|-----------------------|------|----------------|
| <b>&lt;323</b>           | 90  | <sup>23</sup> ABLIKIM | 07I  | BES2 $e^+ e^-$ |

$\Gamma(K^+ K^- \pi^+ \pi^- 2\pi^0)/\Gamma_{\text{total}}$   $\Gamma_{50}/\Gamma$

| VALUE (units $10^{-3}$ ) | CL% | EVTS | DOCUMENT ID | TECN | COMMENT                               |
|--------------------------|-----|------|-------------|------|---------------------------------------|
| <b>&lt;26.7</b>          | 90  | 24   | ABLIKIM     | 08N  | BES2 $e^+ e^- \rightarrow \psi(3770)$ |

$\Gamma(K^+ K^- 2(\pi^+ \pi^-))/\Gamma_{\text{total}}$   $\Gamma_{51}/\Gamma$

| VALUE (units $10^{-3}$ ) | CL% | DOCUMENT ID           | TECN | COMMENT                               |
|--------------------------|-----|-----------------------|------|---------------------------------------|
| <b>&lt;10.3</b>          | 90  | <sup>23</sup> ABLIKIM | 07F  | BES2 $e^+ e^- \rightarrow \psi(3770)$ |

$\Gamma(K^+ K^- 2(\pi^+ \pi^-) \pi^0)/\Gamma_{\text{total}}$   $\Gamma_{52}/\Gamma$

| VALUE (units $10^{-3}$ ) | CL% | DOCUMENT ID           | TECN | COMMENT                               |
|--------------------------|-----|-----------------------|------|---------------------------------------|
| <b>&lt;36.0</b>          | 90  | <sup>23</sup> ABLIKIM | 07F  | BES2 $e^+ e^- \rightarrow \psi(3770)$ |

$\Gamma(\eta K^+ K^-)/\Gamma_{\text{total}}$   $\Gamma_{53}/\Gamma$

| VALUE (units $10^{-4}$ )  | CL% | DOCUMENT ID           | TECN | COMMENT                               |
|---|-----|-----------------------|------|---------------------------------------|
| <b>&lt; 4.1</b>   | 90  | <sup>27</sup> HUANG   | 06A  | CLEO $e^+ e^- \rightarrow \psi(3770)$ |
| • • • We do not use the following data for averages, fits, limits, etc. • • • |     |                       |      |                                       |
| <31   | 90  | <sup>23</sup> ABLIKIM | 10D  | BES2 $e^+ e^- \rightarrow \psi(3770)$ |

$\Gamma(\eta K^+ K^- \pi^+ \pi^-)/\Gamma_{\text{total}}$   $\Gamma_{54}/\Gamma$

| VALUE (units $10^{-2}$ ) | CL% | DOCUMENT ID           | TECN | COMMENT                               |
|--------------------------|-----|-----------------------|------|---------------------------------------|
| <b>&lt;1.24</b>          | 90  | <sup>23</sup> ABLIKIM | 10D  | BES2 $e^+ e^- \rightarrow \psi(3770)$ |

$\Gamma(\rho^0 K^+ K^-)/\Gamma_{\text{total}}$   $\Gamma_{55}/\Gamma$

| VALUE (units $10^{-3}$ ) | CL% | DOCUMENT ID           | TECN | COMMENT                               |
|--------------------------|-----|-----------------------|------|---------------------------------------|
| <b>&lt;5.0</b>           | 90  | <sup>23</sup> ABLIKIM | 07F  | BES2 $e^+ e^- \rightarrow \psi(3770)$ |

**$\Gamma(2(K^+ K^-))/\Gamma_{\text{total}}$   $\Gamma_{56}/\Gamma$**

| <u>VALUE (units <math>10^{-4}</math>)</u>                                     | <u>CL%</u> | <u>DOCUMENT ID</u>    | <u>TECN</u> | <u>COMMENT</u>                        |
|---|------------|-----------------------|-------------|---------------------------------------|
| <b>&lt; 6.0</b>   | 90         | <sup>27</sup> HUANG   | 06A         | CLEO $e^+ e^- \rightarrow \psi(3770)$ |
| ● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ● |            |                       |             |                                       |
| <17   |            | <sup>23</sup> ABLIKIM | 07B         | BES2 $e^+ e^- \rightarrow \psi(3770)$ |

**$\Gamma(\phi K^+ K^-)/\Gamma_{\text{total}}$   $\Gamma_{57}/\Gamma$**

| <u>VALUE (units <math>10^{-4}</math>)</u>                                     | <u>CL%</u> | <u>DOCUMENT ID</u>    | <u>TECN</u> | <u>COMMENT</u>                        |
|---|------------|-----------------------|-------------|---------------------------------------|
| <b>&lt; 7.5</b>   | 90         | <sup>27</sup> HUANG   | 06A         | CLEO $e^+ e^- \rightarrow \psi(3770)$ |
| ● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ● |            |                       |             |                                       |
| <24   |            | <sup>23</sup> ABLIKIM | 07B         | BES2 $e^+ e^- \rightarrow \psi(3770)$ |

**$\Gamma(2(K^+ K^-)\pi^0)/\Gamma_{\text{total}}$   $\Gamma_{58}/\Gamma$**

| <u>VALUE (units <math>10^{-4}</math>)</u>                                     | <u>CL%</u> | <u>DOCUMENT ID</u>    | <u>TECN</u> | <u>COMMENT</u>                        |
|---|------------|-----------------------|-------------|---------------------------------------|
| <b>&lt; 2.9</b>   | 90         | <sup>27</sup> HUANG   | 06A         | CLEO $e^+ e^- \rightarrow \psi(3770)$ |
| ● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ● |            |                       |             |                                       |
| <46   |            | <sup>23</sup> ABLIKIM | 07B         | BES2 $e^+ e^- \rightarrow \psi(3770)$ |

**$\Gamma(2(K^+ K^-)\pi^+ \pi^-)/\Gamma_{\text{total}}$   $\Gamma_{59}/\Gamma$**

| <u>VALUE (units <math>10^{-3}</math>)</u> | <u>CL%</u> | <u>DOCUMENT ID</u>    | <u>TECN</u> | <u>COMMENT</u>                        |
|---|------------|-----------------------|-------------|---------------------------------------|
| <b>&lt;3.2</b>                            | 90         | <sup>23</sup> ABLIKIM | 07F         | BES2 $e^+ e^- \rightarrow \psi(3770)$ |

**$\Gamma(K_S^0 K^- \pi^+)/\Gamma_{\text{total}}$   $\Gamma_{60}/\Gamma$**

| <u>VALUE (units <math>10^{-3}</math>)</u> | <u>CL%</u> | <u>EVTS</u> | <u>DOCUMENT ID</u> | <u>TECN</u> | <u>COMMENT</u>                        |
|---|------------|-------------|--------------------|-------------|---------------------------------------|
| <b>&lt;3.2</b>                            | 90         | 18          | ABLIKIM            | 08M         | BES2 $e^+ e^- \rightarrow \psi(3770)$ |

**$\Gamma(K_S^0 K^- \pi^+ \pi^0)/\Gamma_{\text{total}}$   $\Gamma_{61}/\Gamma$**

| <u>VALUE (units <math>10^{-3}</math>)</u> | <u>CL%</u> | <u>EVTS</u> | <u>DOCUMENT ID</u> | <u>TECN</u> | <u>COMMENT</u>                        |
|---|------------|-------------|--------------------|-------------|---------------------------------------|
| <b>&lt;13.3</b>                           | 90         | 40          | ABLIKIM            | 08M         | BES2 $e^+ e^- \rightarrow \psi(3770)$ |

**$\Gamma(K_S^0 K^- \rho^+)/\Gamma_{\text{total}}$   $\Gamma_{62}/\Gamma$**

| <u>VALUE (units <math>10^{-3}</math>)</u> | <u>CL%</u> | <u>DOCUMENT ID</u> | <u>TECN</u> | <u>COMMENT</u>                        |
|---|------------|--------------------|-------------|---------------------------------------|
| <b>&lt;6.6</b>                            | 90         | ABLIKIM            | 09C         | BES2 $e^+ e^- \rightarrow \psi(3770)$ |

**$\Gamma(K_S^0 K^- 2\pi^+ \pi^-)/\Gamma_{\text{total}}$   $\Gamma_{63}/\Gamma$**

| <u>VALUE (units <math>10^{-3}</math>)</u> | <u>CL%</u> | <u>EVTS</u> | <u>DOCUMENT ID</u> | <u>TECN</u> | <u>COMMENT</u>                        |
|---|------------|-------------|--------------------|-------------|---------------------------------------|
| <b>&lt;8.7</b>                            | 90         | 39          | ABLIKIM            | 08M         | BES2 $e^+ e^- \rightarrow \psi(3770)$ |

**$\Gamma(K_S^0 K^- \pi^+ \rho^0)/\Gamma_{\text{total}}$   $\Gamma_{64}/\Gamma$**

| <u>VALUE (units <math>10^{-2}</math>)</u> | <u>CL%</u> | <u>DOCUMENT ID</u> | <u>TECN</u> | <u>COMMENT</u>                        |
|---|------------|--------------------|-------------|---------------------------------------|
| <b>&lt;1.6</b>                            | 90         | ABLIKIM            | 09C         | BES2 $e^+ e^- \rightarrow \psi(3770)$ |

**$\Gamma(K_S^0 K^- \pi^+ \eta)/\Gamma_{\text{total}}$   $\Gamma_{65}/\Gamma$**

| <u>VALUE (units <math>10^{-2}</math>)</u> | <u>CL%</u> | <u>DOCUMENT ID</u> | <u>TECN</u> | <u>COMMENT</u>                        |
|---|------------|--------------------|-------------|---------------------------------------|
| <b>&lt;1.3</b>                            | 90         | ABLIKIM            | 09C         | BES2 $e^+ e^- \rightarrow \psi(3770)$ |

$\Gamma(K_S^0 K^- 2\pi^+ \pi^- \pi^0)/\Gamma_{\text{total}}$   $\Gamma_{66}/\Gamma$

| VALUE (units $10^{-3}$ ) | CL% | EVTS | DOCUMENT ID | TECN | COMMENT                               |
|--------------------------|-----|------|-------------|------|---------------------------------------|
| <41.8                    | 90  | 23   | ABLIKIM     | 08M  | BES2 $e^+ e^- \rightarrow \psi(3770)$ |

$\Gamma(K_S^0 K^- 2\pi^+ \pi^- \eta)/\Gamma_{\text{total}}$   $\Gamma_{67}/\Gamma$

| VALUE (units $10^{-2}$ ) | CL% | DOCUMENT ID | TECN | COMMENT                               |
|--------------------------|-----|-------------|------|---------------------------------------|
| <4.8                     | 90  | ABLIKIM     | 09C  | BES2 $e^+ e^- \rightarrow \psi(3770)$ |

$\Gamma(K_S^0 K^- \pi^+ 2(\pi^+ \pi^-))/\Gamma_{\text{total}}$   $\Gamma_{68}/\Gamma$

| VALUE (units $10^{-3}$ ) | CL% | EVTS | DOCUMENT ID | TECN | COMMENT                               |
|--------------------------|-----|------|-------------|------|---------------------------------------|
| <12.2                    | 90  | 4    | ABLIKIM     | 08M  | BES2 $e^+ e^- \rightarrow \psi(3770)$ |

$\Gamma(K_S^0 K^- \pi^+ 2\pi^0)/\Gamma_{\text{total}}$   $\Gamma_{69}/\Gamma$

| VALUE (units $10^{-3}$ ) | CL% | EVTS | DOCUMENT ID | TECN | COMMENT                               |
|--------------------------|-----|------|-------------|------|---------------------------------------|
| <26.5                    | 90  | 17   | ABLIKIM     | 08M  | BES2 $e^+ e^- \rightarrow \psi(3770)$ |

$\Gamma(K_S^0 K^- K^+ K^- \pi^+)/\Gamma_{\text{total}}$   $\Gamma_{70}/\Gamma$

| VALUE (units $10^{-3}$ ) | CL% | DOCUMENT ID | TECN | COMMENT                               |
|--------------------------|-----|-------------|------|---------------------------------------|
| <4.9                     | 90  | ABLIKIM     | 09C  | BES2 $e^+ e^- \rightarrow \psi(3770)$ |

$\Gamma(K_S^0 K^- K^+ K^- \pi^+ \pi^0)/\Gamma_{\text{total}}$   $\Gamma_{71}/\Gamma$

| VALUE (units $10^{-2}$ ) | CL% | DOCUMENT ID | TECN | COMMENT                               |
|--------------------------|-----|-------------|------|---------------------------------------|
| <3.0                     | 90  | ABLIKIM     | 09C  | BES2 $e^+ e^- \rightarrow \psi(3770)$ |

$\Gamma(K_S^0 K^- K^+ K^- \pi^+ \eta)/\Gamma_{\text{total}}$   $\Gamma_{72}/\Gamma$

| VALUE (units $10^{-2}$ ) | CL% | DOCUMENT ID | TECN | COMMENT                               |
|--------------------------|-----|-------------|------|---------------------------------------|
| <2.2                     | 90  | ABLIKIM     | 09C  | BES2 $e^+ e^- \rightarrow \psi(3770)$ |

$\Gamma(K^{*0} K^- \pi^+ + \text{c.c.})/\Gamma_{\text{total}}$   $\Gamma_{73}/\Gamma$

| VALUE (units $10^{-3}$ ) | CL% | DOCUMENT ID | TECN | COMMENT                               |
|--------------------------|-----|-------------|------|---------------------------------------|
| <9.7                     | 90  | 23 ABLIKIM  | 07F  | BES2 $e^+ e^- \rightarrow \psi(3770)$ |

$\Gamma(p\bar{p}\pi^0)/\Gamma_{\text{total}}$   $\Gamma_{74}/\Gamma$

| VALUE (units $10^{-4}$ ) | DOCUMENT ID | TECN | COMMENT                               |
|--------------------------|-------------|------|---------------------------------------|
| <12                      | 23 ABLIKIM  | 07B  | BES2 $e^+ e^- \rightarrow \psi(3770)$ |

$\Gamma(p\bar{p}\pi^+ \pi^-)/\Gamma_{\text{total}}$   $\Gamma_{75}/\Gamma$

| VALUE (units $10^{-4}$ )  | CL% | DOCUMENT ID | TECN | COMMENT                               |
|---|-----|-------------|------|---------------------------------------|
| < 5.8   | 90  | 27 HUANG    | 06A  | CLEO $e^+ e^- \rightarrow \psi(3770)$ |
| • • • We do not use the following data for averages, fits, limits, etc. • • • |     |             |      |                                       |
| <16   |     | 23 ABLIKIM  | 07B  | BES2 $e^+ e^- \rightarrow \psi(3770)$ |

$\Gamma(\Lambda\bar{\Lambda})/\Gamma_{\text{total}}$   $\Gamma_{76}/\Gamma$

| VALUE (units $10^{-4}$ )  | CL% | DOCUMENT ID | TECN | COMMENT                               |
|---|-----|-------------|------|---------------------------------------|
| <1.2  | 90  | 27 HUANG    | 06A  | CLEO $e^+ e^- \rightarrow \psi(3770)$ |
| • • • We do not use the following data for averages, fits, limits, etc. • • • |     |             |      |                                       |
| <4  | 90  | 23 ABLIKIM  | 07F  | BES2 $e^+ e^- \rightarrow \psi(3770)$ |

**$\Gamma(\rho\bar{\rho}\pi^+\pi^-\pi^0)/\Gamma_{\text{total}}$   $\Gamma_{77}/\Gamma$**

| <u>VALUE (units <math>10^{-4}</math>)</u>                                     | <u>CL%</u> | <u>DOCUMENT ID</u>    | <u>TECN</u> | <u>COMMENT</u>                       |
|---|------------|-----------------------|-------------|--------------------------------------|
| <b>&lt;18.5</b>   | 90         | <sup>27</sup> HUANG   | 06A         | CLEO $e^+e^- \rightarrow \psi(3770)$ |
| ● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ● |            |                       |             |                                      |
| <73   |            | <sup>23</sup> ABLIKIM | 07B         | BES2 $e^+e^- \rightarrow \psi(3770)$ |

**$\Gamma(\omega\rho\bar{\rho})/\Gamma_{\text{total}}$   $\Gamma_{78}/\Gamma$**

| <u>VALUE (units <math>10^{-4}</math>)</u>                                     | <u>CL%</u> | <u>DOCUMENT ID</u>    | <u>TECN</u> | <u>COMMENT</u>                       |
|---|------------|-----------------------|-------------|--------------------------------------|
| <b>&lt; 2.9</b>   | 90         | <sup>27</sup> HUANG   | 06A         | CLEO $e^+e^- \rightarrow \psi(3770)$ |
| ● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ● |            |                       |             |                                      |
| <30   | 90         | <sup>28</sup> ABLIKIM | 07I         | BES2 $3.77 e^+e^-$                   |

**$\Gamma(\Lambda\bar{\Lambda}\pi^0)/\Gamma_{\text{total}}$   $\Gamma_{79}/\Gamma$**

| <u>VALUE (units <math>10^{-4}</math>)</u> | <u>CL%</u> | <u>DOCUMENT ID</u>    | <u>TECN</u> | <u>COMMENT</u>     |
|---|------------|-----------------------|-------------|--------------------|
| <b>&lt;12</b>                             | 90         | <sup>23</sup> ABLIKIM | 07I         | BES2 $3.77 e^+e^-$ |

**$\Gamma(\rho\bar{\rho}2(\pi^+\pi^-))/\Gamma_{\text{total}}$   $\Gamma_{80}/\Gamma$**

| <u>VALUE (units <math>10^{-3}</math>)</u> | <u>CL%</u> | <u>DOCUMENT ID</u>    | <u>TECN</u> | <u>COMMENT</u>                       |
|---|------------|-----------------------|-------------|--------------------------------------|
| <b>&lt;2.6</b>                            | 90         | <sup>23</sup> ABLIKIM | 07F         | BES2 $e^+e^- \rightarrow \psi(3770)$ |

**$\Gamma(\eta\rho\bar{\rho})/\Gamma_{\text{total}}$   $\Gamma_{81}/\Gamma$**

| <u>VALUE (units <math>10^{-4}</math>)</u>                                     | <u>CL%</u> | <u>DOCUMENT ID</u>    | <u>TECN</u> | <u>COMMENT</u>                       |
|---|------------|-----------------------|-------------|--------------------------------------|
| <b>&lt; 5.4</b>   | 90         | <sup>27</sup> HUANG   | 06A         | CLEO $e^+e^- \rightarrow \psi(3770)$ |
| ● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ● |            |                       |             |                                      |
| <11   | 90         | <sup>23</sup> ABLIKIM | 10D         | BES2 $e^+e^- \rightarrow \psi(3770)$ |

**$\Gamma(\eta\rho\bar{\rho}\pi^+\pi^-)/\Gamma_{\text{total}}$   $\Gamma_{82}/\Gamma$**

| <u>VALUE (units <math>10^{-3}</math>)</u> | <u>CL%</u> | <u>DOCUMENT ID</u>    | <u>TECN</u> | <u>COMMENT</u>                       |
|---|------------|-----------------------|-------------|--------------------------------------|
| <b>&lt;3.3</b>                            | 90         | <sup>23</sup> ABLIKIM | 10D         | BES2 $e^+e^- \rightarrow \psi(3770)$ |

**$\Gamma(\rho^0\rho\bar{\rho})/\Gamma_{\text{total}}$   $\Gamma_{83}/\Gamma$**

| <u>VALUE (units <math>10^{-3}</math>)</u> | <u>CL%</u> | <u>DOCUMENT ID</u>    | <u>TECN</u> | <u>COMMENT</u>                       |
|---|------------|-----------------------|-------------|--------------------------------------|
| <b>&lt;1.7</b>                            | 90         | <sup>23</sup> ABLIKIM | 07F         | BES2 $e^+e^- \rightarrow \psi(3770)$ |

**$\Gamma(\rho\bar{\rho}K^+K^-)/\Gamma_{\text{total}}$   $\Gamma_{84}/\Gamma$**

| <u>VALUE (units <math>10^{-4}</math>)</u>                                     | <u>CL%</u> | <u>DOCUMENT ID</u>    | <u>TECN</u> | <u>COMMENT</u>                       |
|---|------------|-----------------------|-------------|--------------------------------------|
| <b>&lt; 3.2</b>   | 90         | <sup>27</sup> HUANG   | 06A         | CLEO $e^+e^- \rightarrow \psi(3770)$ |
| ● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ● |            |                       |             |                                      |
| <11   |            | <sup>23</sup> ABLIKIM | 07B         | BES2 $e^+e^- \rightarrow \psi(3770)$ |

**$\Gamma(\eta\rho\bar{\rho}K^+K^-)/\Gamma_{\text{total}}$   $\Gamma_{85}/\Gamma$**

| <u>VALUE (units <math>10^{-3}</math>)</u> | <u>CL%</u> | <u>DOCUMENT ID</u>    | <u>TECN</u> | <u>COMMENT</u>                       |
|---|------------|-----------------------|-------------|--------------------------------------|
| <b>&lt;6.9</b>                            | 90         | <sup>23</sup> ABLIKIM | 10D         | BES2 $e^+e^- \rightarrow \psi(3770)$ |

**$\Gamma(\pi^0 p \bar{p} K^+ K^-)/\Gamma_{\text{total}}$**   **$\Gamma_{86}/\Gamma$**

| <u>VALUE (units <math>10^{-3}</math>)</u> | <u>CL%</u> | <u>DOCUMENT ID</u>    | <u>TECN</u> | <u>COMMENT</u>                        |
|---|------------|-----------------------|-------------|---------------------------------------|
| <b>&lt;1.2</b>                            | 90         | <sup>23</sup> ABLIKIM | 10D         | BES2 $e^+ e^- \rightarrow \psi(3770)$ |

**$\Gamma(\phi p \bar{p})/\Gamma_{\text{total}}$**   **$\Gamma_{87}/\Gamma$**

| <u>VALUE (units <math>10^{-4}</math>)</u>                                     | <u>CL%</u> | <u>DOCUMENT ID</u>    | <u>TECN</u> | <u>COMMENT</u>                        |
|---|------------|-----------------------|-------------|---------------------------------------|
| <b>&lt;1.3</b>  | 90         | <sup>27</sup> HUANG   | 06A         | CLEO $e^+ e^- \rightarrow \psi(3770)$ |
| • • • We do not use the following data for averages, fits, limits, etc. • • • |            |                       |             |                                       |
| <9  |            | <sup>23</sup> ABLIKIM | 07B         | BES2 $e^+ e^- \rightarrow \psi(3770)$ |

**$\Gamma(\Lambda \bar{\Lambda} \pi^+ \pi^-)/\Gamma_{\text{total}}$**   **$\Gamma_{88}/\Gamma$**

| <u>VALUE (units <math>10^{-4}</math>)</u>                                     | <u>CL%</u> | <u>DOCUMENT ID</u>    | <u>TECN</u> | <u>COMMENT</u>                        |
|---|------------|-----------------------|-------------|---------------------------------------|
| <b>&lt; 2.5</b>   | 90         | <sup>27</sup> HUANG   | 06A         | CLEO $e^+ e^- \rightarrow \psi(3770)$ |
| • • • We do not use the following data for averages, fits, limits, etc. • • • |            |                       |             |                                       |
| <39   | 90         | <sup>23</sup> ABLIKIM | 07F         | BES2 $e^+ e^- \rightarrow \psi(3770)$ |

**$\Gamma(\Lambda \bar{p} K^+)/\Gamma_{\text{total}}$**   **$\Gamma_{89}/\Gamma$**

| <u>VALUE (units <math>10^{-4}</math>)</u> | <u>CL%</u> | <u>DOCUMENT ID</u>  | <u>TECN</u> | <u>COMMENT</u>                        |
|---|------------|---------------------|-------------|---------------------------------------|
| <b>&lt;2.8</b>                            | 90         | <sup>27</sup> HUANG | 06A         | CLEO $e^+ e^- \rightarrow \psi(3770)$ |

**$\Gamma(\Lambda \bar{p} K^+ \pi^+ \pi^-)/\Gamma_{\text{total}}$**   **$\Gamma_{90}/\Gamma$**

| <u>VALUE (units <math>10^{-4}</math>)</u> | <u>CL%</u> | <u>DOCUMENT ID</u>  | <u>TECN</u> | <u>COMMENT</u>                        |
|---|------------|---------------------|-------------|---------------------------------------|
| <b>&lt;6.3</b>                            | 90         | <sup>27</sup> HUANG | 06A         | CLEO $e^+ e^- \rightarrow \psi(3770)$ |

<sup>22</sup> Comparing cross sections at  $\sqrt{s} = 3.773$  GeV and  $\sqrt{s} = 3.671$  GeV, neglecting interference, and using  $\sigma(\psi(3770) \rightarrow D\bar{D}) = 6.39 \pm 0.20$  nb.

<sup>23</sup> Assuming that interference effects between resonance and continuum can be neglected and using  $\sigma^{obs}(e^+ e^- \rightarrow \psi(3770)) = 7.15 \pm 0.38$  nb.

<sup>24</sup> Data suggest possible destructive interference with continuum.

<sup>25</sup> Using  $\sigma(e^+ e^- \rightarrow \psi(3770) \rightarrow \text{hadrons}) = (6.38 \pm 0.08^{+0.41}_{-0.30})$  nb from BESSON 06 and  $B(K_S^0 \rightarrow \pi^+ \pi^-) = 0.6895 \pm 0.0014$ .

<sup>26</sup> Using  $B(K_S^0 \rightarrow \pi^+ \pi^-) = 0.6860 \pm 0.0027$ .

<sup>27</sup> Using  $\sigma_{tot}(e^+ e^- \rightarrow \psi(3770)) = 7.9 \pm 0.6$  nb at the resonance.

<sup>28</sup> Using  $\sigma^{obs} = 7.15 \pm 0.27 \pm 0.27$  nb and neglecting interference.

————— **RADIATIVE DECAYS** —————

**$\Gamma(\gamma \chi_{c2})/\Gamma_{\text{total}}$**   **$\Gamma_{91}/\Gamma$**

| <u>VALUE (units <math>10^{-3}</math>)</u> | <u>CL%</u> | <u>DOCUMENT ID</u> | <u>TECN</u> | <u>COMMENT</u>   |
|---|------------|--------------------|-------------|--|
| <b>&lt;0.9</b>                            | 90         | <sup>29</sup> COAN | 06A         | CLEO $e^+ e^- \rightarrow \psi(3770) \rightarrow \gamma \gamma J/\psi$ |

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

|      |    |                      |    |   |
|------|----|----------------------|----|---|
| <2.0 | 90 | <sup>30</sup> BRIERE | 06 | CLEO $e^+ e^- \rightarrow \psi(3770) \rightarrow \gamma + \text{hadrons}$ |
|------|----|----------------------|----|---|



| $\Gamma(\gamma\chi_{c1})/\Gamma_{\text{total}}$                               |             |             |          |  | $\Gamma_{92}/\Gamma$ |
|---|-------------|-------------|----------|--|----------------------|
| VALUE (units $10^{-3}$ )  | EVTS        | DOCUMENT ID | TECN     | COMMENT  |                      |
| <b><math>2.9 \pm 0.5 \pm 0.4</math></b>                                       |             | 31 BRIERE   | 06 CLEO  | $e^+e^- \rightarrow \psi(3770) \rightarrow \gamma + \text{hadrons}, \gamma\gamma J/\psi$ |                      |
| • • • We do not use the following data for averages, fits, limits, etc. • • • |             |             |          |  |                      |
| $3.9 \pm 1.4 \pm 0.6$   | $54 \pm 17$ | 32 BRIERE   | 06 CLEO  | $e^+e^- \rightarrow \psi(3770) \rightarrow \gamma + \text{hadrons}$                      |                      |
| $2.8 \pm 0.5 \pm 0.4$   | $53 \pm 10$ | 29 COAN     | 06A CLEO | $e^+e^- \rightarrow \psi(3770) \rightarrow \gamma\gamma J/\psi$                          |                      |

| $\Gamma(\gamma\chi_{c1})/\Gamma(J/\psi\pi^+\pi^-)$ |             |             |          |   | $\Gamma_{92}/\Gamma_4$ |
|--|-------------|-------------|----------|---|------------------------|
| VALUE  | EVTS        | DOCUMENT ID | TECN     | COMMENT   |                        |
| <b><math>1.49 \pm 0.31 \pm 0.26</math></b>         | $53 \pm 10$ | 33 COAN     | 06A CLEO | $e^+e^- \rightarrow \psi(3770) \rightarrow \gamma\gamma J/\psi$ |                        |

| $\Gamma(\gamma\chi_{c0})/\Gamma_{\text{total}}$                               |     |              |             |          | $\Gamma_{93}/\Gamma$  |
|---|-----|--------------|-------------|----------|---|
| VALUE (units $10^{-3}$ )  | CL% | EVTS         | DOCUMENT ID | TECN     | COMMENT   |
| <b><math>7.3 \pm 0.7 \pm 0.6</math></b>                                       |     | $274 \pm 27$ | 34 BRIERE   | 06 CLEO  | $e^+e^- \rightarrow \psi(3770) \rightarrow \gamma + \text{hadrons}$ |
| • • • We do not use the following data for averages, fits, limits, etc. • • • |     |              |             |          |   |
| $< 44$  | 90  |              | 29 COAN     | 06A CLEO | $e^+e^- \rightarrow \psi(3770) \rightarrow \gamma\gamma J/\psi$     |

| $\Gamma(\gamma\chi_{c0})/\Gamma(\gamma\chi_{c2})$ |     |             |         |                                 | $\Gamma_{93}/\Gamma_{91}$ |
|---|-----|-------------|---------|---------------------------------|---------------------------|
| VALUE   | CL% | DOCUMENT ID | TECN    | COMMENT                         |                           |
| $> 8$   | 90  | 35 BRIERE   | 06 CLEO | $e^+e^- \rightarrow \psi(3770)$ |                           |

| $\Gamma(\gamma\chi_{c0})/\Gamma(\gamma\chi_{c1})$ |             |         |                                 |  | $\Gamma_{93}/\Gamma_{92}$ |
|---|-------------|---------|---------------------------------|--|---------------------------|
| VALUE   | DOCUMENT ID | TECN    | COMMENT                         |  |                           |
| $2.5 \pm 0.6$                                     | 35 BRIERE   | 06 CLEO | $e^+e^- \rightarrow \psi(3770)$ |  |                           |

| $\Gamma(\gamma\eta')/\Gamma_{\text{total}}$ |     |             |         |                                 | $\Gamma_{94}/\Gamma$ |
|---|-----|-------------|---------|---------------------------------|----------------------|
| VALUE (units $10^{-4}$ )                    | CL% | DOCUMENT ID | TECN    | COMMENT                         |                      |
| <b><math>&lt; 1.8</math></b>                | 90  | 36 PEDLAR   | 09 CLE3 | $\psi(2S) \rightarrow \gamma X$ |                      |

| $\Gamma(\gamma\eta)/\Gamma_{\text{total}}$ |     |             |         |                                 | $\Gamma_{95}/\Gamma$ |
|--|-----|-------------|---------|---------------------------------|----------------------|
| VALUE (units $10^{-4}$ )                   | CL% | DOCUMENT ID | TECN    | COMMENT                         |                      |
| <b><math>&lt; 1.5</math></b>               | 90  | 36 PEDLAR   | 09 CLE3 | $\psi(2S) \rightarrow \gamma X$ |                      |

| $\Gamma(\gamma\pi^0)/\Gamma_{\text{total}}$ |     |             |         |                                 | $\Gamma_{96}/\Gamma$ |
|---|-----|-------------|---------|---------------------------------|----------------------|
| VALUE (units $10^{-4}$ )                    | CL% | DOCUMENT ID | TECN    | COMMENT                         |                      |
| <b><math>&lt; 2</math></b>                  | 90  | PEDLAR      | 09 CLE3 | $\psi(2S) \rightarrow \gamma X$ |                      |

- <sup>29</sup> Using  $\Gamma_{ee}(\psi(2S)) = (2.54 \pm 0.03 \pm 0.11)$  keV from ADAM 06 and taking  $\sigma(e^+e^- \rightarrow D\bar{D})$  from HE 05 for  $\sigma(e^+e^- \rightarrow \psi(3770))$ .
- <sup>30</sup> Uses  $B(\psi(2S) \rightarrow \gamma\chi_{c2}) = 9.22 \pm 0.11 \pm 0.46\%$  from ATHAR 04,  $\psi(2S)$  mass and width from PDG 04, and  $\Gamma_{ee}(\psi(2S)) = 2.54 \pm 0.03 \pm 0.11$  keV from ADAM 06.
- <sup>31</sup> Averages the two measurements from COAN 06A and BRIERE 06.
- <sup>32</sup> Uses  $B(\psi(2S) \rightarrow \gamma\chi_{c1}) = 9.07 \pm 0.11 \pm 0.54\%$  from ATHAR 04,  $\psi(2S)$  mass and width from PDG 04, and  $\Gamma_{ee}(\psi(2S)) = 2.54 \pm 0.03 \pm 0.11$  keV from ADAM 06.
- <sup>33</sup> Using  $B(\psi(3770) \rightarrow J/\psi\pi^+\pi^-) = (1.89 \pm 0.20 \pm 0.20) \times 10^{-3}$  from ADAM 06.
- <sup>34</sup> Uses  $B(\psi(2S) \rightarrow \gamma\chi_{c0}) = 9.33 \pm 0.14 \pm 0.61\%$  from ATHAR 04,  $\psi(2S)$  mass and width from PDG 04, and  $\Gamma_{ee}(\psi(2S)) = 2.54 \pm 0.03 \pm 0.11$  keV from ADAM 06.
- <sup>35</sup> Not independent of other results in BRIERE 06.
- <sup>36</sup> Assuming maximal destructive interference between  $\psi(3770)$  and continuum sources.

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