

$\psi(4040)$

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

$\psi(4040)$ MASS

VALUE (MeV)	DOCUMENT ID	TECN	COMMENT
4039 ± 1 OUR ESTIMATE			
4039.6 ± 4.3	¹ ABLIKIM	08D	BES2 $e^+e^- \rightarrow$ hadrons
• • • We do not use the following data for averages, fits, limits, etc. • • •			
4034 ± 6	² MO	10	RVUE $e^+e^- \rightarrow$ hadrons
4037 ± 2	³ SETH	05A	RVUE $e^+e^- \rightarrow$ hadrons
4040 ± 1	⁴ SETH	05A	RVUE $e^+e^- \rightarrow$ hadrons
4040 ± 10	BRANDELIK	78C	DASP e^+e^-

¹ 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 $\delta = (130 \pm 46)^\circ$.

² Reanalysis of data presented in BAI 00 and BAI 02C. From a global fit over the center-of-mass energy 3.8–4.8 GeV covering the $\psi(4040)$, $\psi(4160)$ and $\psi(4415)$ resonances and including interference effects.

³ From a fit to Crystal Ball (OSTERHELD 86) data.

⁴ From a fit to BES (BAI 02C) data.

$\psi(4040)$ WIDTH

VALUE (MeV)	DOCUMENT ID	TECN	COMMENT
80 ± 10 OUR ESTIMATE			
84.5 ± 12.3	⁵ ABLIKIM	08D	BES2 $e^+e^- \rightarrow$ hadrons
• • • We do not use the following data for averages, fits, limits, etc. • • •			
87 ± 11	⁶ MO	10	RVUE $e^+e^- \rightarrow$ hadrons
85 ± 10	⁷ SETH	05A	RVUE $e^+e^- \rightarrow$ hadrons
89 ± 6	⁸ SETH	05A	RVUE $e^+e^- \rightarrow$ hadrons
52 ± 10	BRANDELIK	78C	DASP e^+e^-

⁵ 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 $\delta = (130 \pm 46)^\circ$.

⁶ Reanalysis of data presented in BAI 00 and BAI 02C. From a global fit over the center-of-mass energy 3.8–4.8 GeV covering the $\psi(4040)$, $\psi(4160)$ and $\psi(4415)$ resonances and including interference effects.

⁷ From a fit to Crystal Ball (OSTERHELD 86) data.

⁸ From a fit to BES (BAI 02C) data.

$\psi(4040)$ DECAY MODES

Due to the complexity of the $c\bar{c}$ threshold region, in this listing, “seen” (“not seen”) means that a cross section for the mode in question has been measured at effective \sqrt{s} near this particle’s central mass value, more

(less) than 2σ above zero, without regard to any peaking behavior in \sqrt{s} or absence thereof. See mode listing(s) for details and references.

Mode	Fraction (Γ_i/Γ)	Confidence level
Γ_1 $e^+ e^-$	$(1.07 \pm 0.16) \times 10^{-5}$	
Γ_2 $D \bar{D}$	seen	
Γ_3 $D^0 \bar{D}^0$	seen	
Γ_4 $D^+ D^-$	seen	
Γ_5 $D^* \bar{D} + \text{c.c.}$	seen	
Γ_6 $D^*(2007)^0 \bar{D}^0 + \text{c.c.}$	seen	
Γ_7 $D^*(2010)^+ D^- + \text{c.c.}$	seen	
Γ_8 $D^* \bar{D}^*$	seen	
Γ_9 $D^*(2007)^0 \bar{D}^*(2007)^0$	seen	
Γ_{10} $D^*(2010)^+ D^*(2010)^-$	seen	
Γ_{11} $D \bar{D} \pi$ (excl. $D^* \bar{D}$)		
Γ_{12} $D^0 D^- \pi^+ + \text{c.c.}$ (excl. $D^*(2007)^0 \bar{D}^0 + \text{c.c.}$, $D^*(2010)^+ D^- + \text{c.c.}$)	not seen	
Γ_{13} $D \bar{D}^* \pi$ (excl. $D^* \bar{D}^*$)	not seen	
Γ_{14} $D^0 \bar{D}^{*-} \pi^+ + \text{c.c.}$ (excl. $D^*(2010)^+ D^*(2010)^-$)	seen	
Γ_{15} $D_s^+ D_s^-$	seen	
Γ_{16} $\pi^+ \pi^+ \pi^- \pi^- \pi^0$		
Γ_{17} $J/\psi(1S)$ hadrons		
Γ_{18} $J/\psi \pi^+ \pi^-$	$< 4 \times 10^{-3}$	90%
Γ_{19} $J/\psi \pi^0 \pi^0$	$< 2 \times 10^{-3}$	90%
Γ_{20} $J/\psi \eta$	$(5.2 \pm 0.7) \times 10^{-3}$	
Γ_{21} $J/\psi \pi^0$	$< 2.8 \times 10^{-4}$	90%
Γ_{22} $J/\psi \pi^+ \pi^- \pi^0$	$< 2 \times 10^{-3}$	90%
Γ_{23} $\chi_{c1} \gamma$	$< 3.4 \times 10^{-3}$	90%
Γ_{24} $\chi_{c2} \gamma$	$< 5 \times 10^{-3}$	90%
Γ_{25} $\chi_{c1} \pi^+ \pi^- \pi^0$	$< 1.1 \%$	90%
Γ_{26} $\chi_{c2} \pi^+ \pi^- \pi^0$	$< 3.2 \%$	90%
Γ_{27} $h_c(1P) \pi^+ \pi^-$	$< 3 \times 10^{-3}$	90%
Γ_{28} $\phi \pi^+ \pi^-$	$< 3 \times 10^{-3}$	90%
Γ_{29} $\Lambda \bar{\Lambda} \pi^+ \pi^-$	$< 2.9 \times 10^{-4}$	90%
Γ_{30} $\Lambda \bar{\Lambda} \pi^0$	$< 9 \times 10^{-5}$	90%
Γ_{31} $\Lambda \bar{\Lambda} \eta$	$< 3.0 \times 10^{-4}$	90%
Γ_{32} $\Lambda \bar{\Lambda}$	$< 6 \times 10^{-6}$	90%
Γ_{33} $\Sigma^+ \bar{\Sigma}^-$	$< 1.3 \times 10^{-4}$	90%
Γ_{34} $\Sigma^0 \bar{\Sigma}^0$	$< 7 \times 10^{-5}$	90%
Γ_{35} $\Xi^+ \bar{\Xi}^-$	$< 1.6 \times 10^{-4}$	90%
Γ_{36} $\Xi^0 \bar{\Xi}^0$	$< 1.8 \times 10^{-4}$	90%
Γ_{37} $\mu^+ \mu^-$	$(9 \pm 6) \times 10^{-6}$	

$\psi(4040)$ PARTIAL WIDTHS **$\Gamma(e^+e^-)$** **Γ_1**

<u>VALUE (keV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
0.86 ± 0.07 OUR ESTIMATE			
0.83 ± 0.20	⁹ ABLIKIM	08D BES2	$e^+e^- \rightarrow$ hadrons
• • • We do not use the following data for averages, fits, limits, etc. • • •			
0.6 to 1.4	¹⁰ MO	10 RVUE	$e^+e^- \rightarrow$ hadrons
0.88 ± 0.11	¹¹ SETH	05A RVUE	$e^+e^- \rightarrow$ hadrons
0.91 ± 0.13	¹² SETH	05A RVUE	$e^+e^- \rightarrow$ hadrons
0.75 ± 0.15	BRANDELIK	78C DASP	e^+e^-

⁹ 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 $\delta = (130 \pm 46)^\circ$.

¹⁰ Reanalysis of data presented in BAI 00 and BAI 02C. From a global fit over the center-of-mass energy 3.8–4.8 GeV covering the $\psi(4040)$, $\psi(4160)$ and $\psi(4415)$ resonances and including interference effects. Four sets of solutions are obtained with the same fit quality, mass and total width, but with different e^+e^- partial widths. We quote only the range of values.

¹¹ From a fit to Crystal Ball (OSTERHELD 86) data.

¹² From a fit to BES (BAI 02C) data.

 $\Gamma(\mu^+\mu^-)$ **Γ_{37}**

<u>VALUE (keV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
$0.73 \pm 0.48 \pm 0.12$	^{13,14} ABLIKIM	20AG BES3	$e^+e^- \rightarrow \mu^+\mu^-$

¹³ From a fit to the $e^+e^- \rightarrow \mu^+\mu^-$ cross section between 3.8 and 4.6 GeV to the coherent sum of four resonant amplitudes assuming $\Gamma(\mu^+\mu^-) = \Gamma(e^+e^-)$.

¹⁴ From solution 1 of 8 with equal fit quality. Other solutions range from $0.58 \pm 0.52 \pm 0.10$ to $0.80 \pm 0.48 \pm 0.13$ keV.

 $\psi(4040) \Gamma(i) \times \Gamma(e^+e^-)/\Gamma(\text{total})$ **$\Gamma(\chi_{c1}\gamma) \times \Gamma(e^+e^-)/\Gamma_{\text{total}}$** **$\Gamma_{23}\Gamma_1/\Gamma$**

<u>VALUE (eV)</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
< 2.9	90	¹⁵ HAN	15 BELL	$10.58 e^+e^- \rightarrow \chi_{c1}\gamma$

¹⁵ Using $B(\eta \rightarrow \gamma\gamma) = (39.41 \pm 0.21)\%$.

 $\Gamma(\chi_{c2}\gamma) \times \Gamma(e^+e^-)/\Gamma_{\text{total}}$ **$\Gamma_{24}\Gamma_1/\Gamma$**

<u>VALUE (eV)</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
< 4.6	90	¹⁶ HAN	15 BELL	$10.58 e^+e^- \rightarrow \chi_{c2}\gamma$

¹⁶ Using $B(\eta \rightarrow \gamma\gamma) = (39.41 \pm 0.21)\%$.

 $\Gamma(J/\psi\eta) \times \Gamma(e^+e^-)/\Gamma_{\text{total}}$ **$\Gamma_{20}\Gamma_1/\Gamma$**

<u>VALUE (eV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
• • • We do not use the following data for averages, fits, limits, etc. • • •			
1.5 ± 0.3	¹⁷ ABLIKIM	200 BES3	$e^+e^- \rightarrow \eta J/\psi$
1.4 ± 0.3	¹⁸ ABLIKIM	200 BES3	$e^+e^- \rightarrow \eta J/\psi$

7.0 ± 0.6

¹⁹ ABLIKIM 200 BES3 $e^+e^- \rightarrow \eta J/\psi$

¹⁷ Solution 1 of three equivalent fit solutions using three resonant structures.

¹⁸ Solution 2 of three equivalent fit solutions using three resonant structures.

¹⁹ Solution 3 of three equivalent fit solutions using three resonant structures.

$\psi(4040) \Gamma(i) \times \Gamma(e^+e^-) / \Gamma^2(\text{total})$

$\Gamma(J/\psi\eta) / \Gamma_{\text{total}} \times \Gamma(e^+e^-) / \Gamma_{\text{total}} \qquad \Gamma_{20} / \Gamma \times \Gamma_1 / \Gamma$

VALUE (units 10^{-8})	DOCUMENT ID	TECN	COMMENT
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• • • We do not use the following data for averages, fits, limits, etc. • • •

5.1 ± 1.4 ± 1.5	²⁰ WANG	13B	BELL $e^+e^- \rightarrow J/\psi\eta\gamma$
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12.8 ± 2.1 ± 1.9	²¹ WANG	13B	BELL $e^+e^- \rightarrow J/\psi\eta\gamma$
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²⁰ Solution I of two equivalent solutions in a fit using two interfering resonances. Mass and width fixed at 4039 MeV and 80 MeV, respectively.

²¹ Solution II of two equivalent solutions in a fit using two interfering resonances. Mass and width fixed at 4039 MeV and 80 MeV, respectively.

$\Gamma(\Lambda\bar{\Lambda}) \times \Gamma(e^+e^-) / \Gamma_{\text{total}} \qquad \Gamma_{32}\Gamma_1 / \Gamma$

VALUE (eV)	CL%	DOCUMENT ID	TECN	COMMENT
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$< 5.5 \times 10^{-3}$	90	²² ABLIKIM	21AS BES3	$e^+e^- \rightarrow \psi(4040)$
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²² From a measurement of the $e^+e^- \rightarrow \Lambda\bar{\Lambda}$ cross section between 3.5 and 4.6 GeV.

$\psi(4040)$ BRANCHING RATIOS

$\Gamma(e^+e^-) / \Gamma_{\text{total}} \qquad \Gamma_1 / \Gamma$

VALUE (units 10^{-5})	DOCUMENT ID	TECN	COMMENT
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• • • We do not use the following data for averages, fits, limits, etc. • • •

~ 1.0	FELDMAN	77	MRK1 e^+e^-
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$\Gamma(D^0\bar{D}^0) / \Gamma_{\text{total}} \qquad \Gamma_3 / \Gamma$

VALUE	DOCUMENT ID	TECN	COMMENT
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seen	AUBERT	09M	BABR $e^+e^- \rightarrow D^0\bar{D}^0\gamma$
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seen	CRONIN-HEN..09	CLEO	$e^+e^- \rightarrow D^0\bar{D}^0$
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seen	PAKHLOVA	08	BELL $e^+e^- \rightarrow D^0\bar{D}^0\gamma$
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$\Gamma(D^+D^-) / \Gamma_{\text{total}} \qquad \Gamma_4 / \Gamma$

VALUE	DOCUMENT ID	TECN	COMMENT
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seen	AUBERT	09M	BABR $e^+e^- \rightarrow D^+D^-\gamma$
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seen	CRONIN-HEN..09	CLEO	$e^+e^- \rightarrow D^+D^-$
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seen	PAKHLOVA	08	BELL $e^+e^- \rightarrow D^+D^-\gamma$
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$\Gamma(D\bar{D}) / \Gamma(D^*\bar{D} + \text{c.c.}) \qquad \Gamma_2 / \Gamma_5$

VALUE	DOCUMENT ID	TECN	COMMENT
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0.24 ± 0.05 ± 0.12	AUBERT	09M	BABR $e^+e^- \rightarrow \gamma D^{(*)}\bar{D}$
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$$\Gamma(D^0 \bar{D}^0) / \Gamma(D^*(2007)^0 \bar{D}^0 + \text{c.c.}) \quad \Gamma_3 / \Gamma_6$$

VALUE	DOCUMENT ID	TECN	COMMENT
0.05 ± 0.03	²³ GOLDHABER 77	MRK1	$e^+ e^-$

²³ Phase-space factor (p^3) explicitly removed.

$$\Gamma(D^*(2007)^0 \bar{D}^0 + \text{c.c.}) / \Gamma_{\text{total}} \quad \Gamma_6 / \Gamma$$

VALUE	DOCUMENT ID	TECN	COMMENT
seen	AUBERT 09M	BABR	$e^+ e^- \rightarrow D^{*0} \bar{D}^0 \gamma$
seen	CRONIN-HEN..09	CLEO	$e^+ e^- \rightarrow D^{*0} \bar{D}^0$

$$\Gamma(D^*(2010)^+ D^- + \text{c.c.}) / \Gamma_{\text{total}} \quad \Gamma_7 / \Gamma$$

VALUE	DOCUMENT ID	TECN	COMMENT
seen	²⁴ ZHUKOVA 18	BELL	$e^+ e^- \rightarrow D^{*+} D^- \gamma$
seen	AUBERT 09M	BABR	$e^+ e^- \rightarrow D^{*+} D^- \gamma$
seen	CRONIN-HEN..09	CLEO	$e^+ e^- \rightarrow D^{*+} D^-$

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

seen	PAKHLOVA 07	BELL	$e^+ e^- \rightarrow D^{*+} D^- \gamma$
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²⁴ Supersedes PAKHLOVA 07.

$$\Gamma(D^*(2010)^+ D^- + \text{c.c.}) / \Gamma(D^*(2007)^0 \bar{D}^0 + \text{c.c.}) \quad \Gamma_7 / \Gamma_6$$

VALUE	DOCUMENT ID	TECN	COMMENT
0.95 ± 0.09 ± 0.10	AUBERT 09M	BABR	$e^+ e^- \rightarrow \gamma D^* \bar{D}$

$$\Gamma(D^* \bar{D}^*) / \Gamma(D^* \bar{D} + \text{c.c.}) \quad \Gamma_8 / \Gamma_5$$

VALUE	DOCUMENT ID	TECN	COMMENT
0.18 ± 0.14 ± 0.03	AUBERT 09M	BABR	$e^+ e^- \rightarrow \gamma D^{(*)} \bar{D}^{(*)}$

$$\Gamma(D^*(2007)^0 \bar{D}^*(2007)^0) / \Gamma_{\text{total}} \quad \Gamma_9 / \Gamma$$

VALUE	DOCUMENT ID	TECN	COMMENT
seen	AUBERT 09M	BABR	$e^+ e^- \rightarrow D^{*0} \bar{D}^{*0} \gamma$
seen	CRONIN-HEN..09	CLEO	$e^+ e^- \rightarrow D^{*0} \bar{D}^{*0}$

$$\Gamma(D^*(2007)^0 \bar{D}^*(2007)^0) / \Gamma(D^*(2007)^0 \bar{D}^0 + \text{c.c.}) \quad \Gamma_9 / \Gamma_6$$

VALUE	DOCUMENT ID	TECN	COMMENT
32.0 ± 12.0	²⁵ GOLDHABER 77	MRK1	$e^+ e^-$

²⁵ Phase-space factor (p^3) explicitly removed.

$$\Gamma(D^*(2010)^+ D^*(2010)^-) / \Gamma_{\text{total}} \quad \Gamma_{10} / \Gamma$$

VALUE	DOCUMENT ID	TECN	COMMENT
seen	²⁶ ZHUKOVA 18	BELL	$e^+ e^- \rightarrow D^{*+} D^{*-} \gamma$
seen	AUBERT 09M	BABR	$e^+ e^- \rightarrow D^{*+} D^{*-} \gamma$
seen	CRONIN-HEN..09	CLEO	$e^+ e^- \rightarrow D^{*+} D^{*-}$

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

seen	PAKHLOVA 07	BELL	$e^+ e^- \rightarrow D^{*+} D^{*-} \gamma$
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²⁶ Supersedes PAKHLOVA 07.

$$\Gamma(D^0 D^- \pi^+ + \text{c.c. (excl. } D^*(2007)^0 \bar{D}^0 + \text{c.c., } D^*(2010)^+ D^- + \text{c.c.))} / \Gamma_{\text{total}} \quad \Gamma_{12}/\Gamma$$

VALUE	DOCUMENT ID	TECN	COMMENT
not seen	PAKHLOVA 08A	BELL	$e^+ e^- \rightarrow D^0 D^- \pi^+ \gamma$

$$\Gamma(D \bar{D}^* \pi (\text{excl. } D^* \bar{D}^*)) / \Gamma_{\text{total}} \quad \Gamma_{13}/\Gamma$$

VALUE	DOCUMENT ID	TECN	COMMENT
not seen	CRONIN-HEN..09	CLEO	$e^+ e^- \rightarrow D \bar{D}^* \pi$

$$\Gamma(D^0 \bar{D}^{*-} \pi^+ + \text{c.c. (excl. } D^*(2010)^+ D^*(2010)^-)) / \Gamma_{\text{total}} \quad \Gamma_{14}/\Gamma$$

VALUE	DOCUMENT ID	TECN	COMMENT
seen	PAKHLOVA 09	BELL	$e^+ e^- \rightarrow D^0 D^{*-} \pi^+ \gamma$

$$\Gamma(D_s^+ D_s^-) / \Gamma_{\text{total}} \quad \Gamma_{15}/\Gamma$$

VALUE	DOCUMENT ID	TECN	COMMENT
seen	PAKHLOVA 11	BELL	$e^+ e^- \rightarrow D_s^+ D_s^- \gamma$
seen	DEL-AMO-SA..10N	BABR	$e^+ e^- \rightarrow D_s^+ D_s^- \gamma$
seen	CRONIN-HEN..09	CLEO	$e^+ e^- \rightarrow D_s^+ D_s^-$

$$\Gamma(\pi^+ \pi^+ \pi^- \pi^- \pi^0) / \Gamma_{\text{total}} \quad \Gamma_{16}/\Gamma$$

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

$(3.51 \pm 1.89 \pm 1.24) \times 10^{-5}$	27 ABLIKIM	21AW BES3	$e^+ e^- \rightarrow 2\pi^+ 2\pi^- \pi^0$
$(2.41 \pm 0.05 \pm 0.79) \times 10^{-2}$	28 ABLIKIM	21AW BES3	$e^+ e^- \rightarrow 2\pi^+ 2\pi^- \pi^0$

²⁷ Solution 1 of two solutions with equal fit quality. The significance of the $\psi(4040)$ signal is 3.6σ .

²⁸ Solution 2 of two solutions with equal fit quality. The significance of the $\psi(4040)$ signal is 3.6σ .

$$\Gamma(J/\psi \pi^+ \pi^-) / \Gamma_{\text{total}} \quad \Gamma_{18}/\Gamma$$

VALUE (units 10^{-3})	CL%	DOCUMENT ID	TECN	COMMENT
<4	90	COAN 06	CLEO	$3.97-4.06 e^+ e^- \rightarrow \text{hadrons}$

$$\Gamma(J/\psi \pi^0 \pi^0) / \Gamma_{\text{total}} \quad \Gamma_{19}/\Gamma$$

VALUE (units 10^{-3})	CL%	DOCUMENT ID	TECN	COMMENT
<2	90	COAN 06	CLEO	$3.97-4.06 e^+ e^- \rightarrow \text{hadrons}$

$$\Gamma(J/\psi \eta) / \Gamma_{\text{total}} \quad \Gamma_{20}/\Gamma$$

VALUE (units 10^{-3})	CL%	DOCUMENT ID	TECN	COMMENT
$5.2 \pm 0.5 \pm 0.5$		²⁹ ABLIKIM 12K	BES3	$e^+ e^- \rightarrow \ell^+ \ell^- 2\gamma$

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

<7	90	COAN 06	CLEO	$3.97-4.06 e^+ e^- \rightarrow \text{hadrons}$
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²⁹ ABLIKIM 12K measure $\sigma(e^+ e^- \rightarrow J/\psi \eta) = 32.1 \pm 2.8 \pm 1.3$ pb. They assume the $\eta J/\psi$ fully originates from $\psi(4040)$ decays.

$\Gamma(J/\psi\pi^0)/\Gamma_{\text{total}}$ Γ_{21}/Γ

VALUE (units 10^{-3})	CL%	DOCUMENT ID	TECN	COMMENT
<0.28	90	³⁰ ABLIKIM	12K	BES3 $e^+e^- \rightarrow \ell^+\ell^-2\gamma$

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

<2	90	COAN	06	CLEO 3.97–4.06 $e^+e^- \rightarrow$ hadrons
³⁰ ABLIKIM 12K measure $\sigma(e^+e^- \rightarrow J/\psi\pi^0) < 1.6$ pb. They assume the $\eta J/\psi$ fully originates from $\psi(4040)$ decays.				

 $\Gamma(J/\psi\pi^+\pi^-\pi^0)/\Gamma_{\text{total}}$ Γ_{22}/Γ

VALUE (units 10^{-3})	CL%	DOCUMENT ID	TECN	COMMENT
<2	90	COAN	06	CLEO 3.97–4.06 $e^+e^- \rightarrow$ hadrons

 $\Gamma(\chi_{c1}\gamma)/\Gamma_{\text{total}}$ Γ_{23}/Γ

VALUE (units 10^{-3})	CL%	DOCUMENT ID	TECN	COMMENT
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• • • We do not use the following data for averages, fits, limits, etc. • • •

<11	90	COAN	06	CLEO 3.97–4.06 $e^+e^- \rightarrow$ hadrons
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 $\Gamma(\chi_{c2}\gamma)/\Gamma_{\text{total}}$ Γ_{24}/Γ

VALUE (units 10^{-3})	CL%	DOCUMENT ID	TECN	COMMENT
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• • • We do not use the following data for averages, fits, limits, etc. • • •

<17	90	COAN	06	CLEO 3.97–4.06 $e^+e^- \rightarrow$ hadrons
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 $\Gamma(\chi_{c1}\pi^+\pi^-\pi^0)/\Gamma_{\text{total}}$ Γ_{25}/Γ

VALUE (units 10^{-3})	CL%	DOCUMENT ID	TECN	COMMENT
<11	90	COAN	06	CLEO 3.97–4.06 $e^+e^- \rightarrow$ hadrons

 $\Gamma(\chi_{c2}\pi^+\pi^-\pi^0)/\Gamma_{\text{total}}$ Γ_{26}/Γ

VALUE (units 10^{-3})	CL%	DOCUMENT ID	TECN	COMMENT
<32	90	COAN	06	CLEO 3.97–4.06 $e^+e^- \rightarrow$ hadrons

 $\Gamma(h_c(1P)\pi^+\pi^-)/\Gamma_{\text{total}}$ Γ_{27}/Γ

VALUE (units 10^{-3})	CL%	DOCUMENT ID	TECN	COMMENT
<3	90	³¹ PEDLAR	11	CLEO $e^+e^- \rightarrow h_c(1P)\pi^+\pi^-$

³¹ From several values of \sqrt{s} near the peak of the $\psi(4040)$, PEDLAR 11 measures $\sigma(e^+e^- \rightarrow h_c(1P)\pi^+\pi^-) = 1.0 \pm 8.0 \pm 5.4 \pm 0.2$ pb, where the errors are statistical, systematic, and due to uncertainty in $B(\psi(2S) \rightarrow \pi^0 h_c(1P))$, respectively.

 $\Gamma(\phi\pi^+\pi^-)/\Gamma_{\text{total}}$ Γ_{28}/Γ

VALUE (units 10^{-3})	CL%	DOCUMENT ID	TECN	COMMENT
<3	90	COAN	06	CLEO 3.97–4.06 $e^+e^- \rightarrow$ hadrons

 $\Gamma(\Lambda\bar{\Lambda}\pi^+\pi^-)/\Gamma_{\text{total}}$ Γ_{29}/Γ

VALUE (units 10^{-4})	CL%	DOCUMENT ID	TECN	COMMENT
<2.9	90	³² ABLIKIM	13Q	BES3 $e^+e^- \rightarrow \psi(4040)$

³² Assuming that interference effects between resonance and continuum can be neglected.

$\Gamma(\Lambda\bar{\Lambda}\pi^0)/\Gamma_{\text{total}}$ Γ_{30}/Γ

VALUE (units 10^{-4})	CL%	DOCUMENT ID	TECN	COMMENT
<0.9	90	³³ ABLIKIM	13Q	BES3 $e^+e^- \rightarrow \psi(4040)$

³³ Assuming that interference effects between resonance and continuum can be neglected.

 $\Gamma(\Lambda\bar{\Lambda}\eta)/\Gamma_{\text{total}}$ Γ_{31}/Γ

VALUE (units 10^{-4})	CL%	DOCUMENT ID	TECN	COMMENT
<3.0	90	³⁴ ABLIKIM	13Q	BES3 $e^+e^- \rightarrow \psi(4040)$

³⁴ Assuming that interference effects between resonance and continuum can be neglected.

 $\Gamma(\Sigma^+\bar{\Sigma}^-)/\Gamma_{\text{total}}$ Γ_{33}/Γ

VALUE (units 10^{-4})	CL%	DOCUMENT ID	TECN	COMMENT
<1.3	90	³⁵ ABLIKIM	13Q	BES3 $e^+e^- \rightarrow \psi(4040)$

³⁵ Assuming that interference effects between resonance and continuum can be neglected.

 $\Gamma(\Sigma^0\bar{\Sigma}^0)/\Gamma_{\text{total}}$ Γ_{34}/Γ

VALUE (units 10^{-4})	CL%	DOCUMENT ID	TECN	COMMENT
<0.7	90	³⁶ ABLIKIM	13Q	BES3 $e^+e^- \rightarrow \psi(4040)$

³⁶ Assuming that interference effects between resonance and continuum can be neglected.

 $\Gamma(\Xi^+\bar{\Xi}^-)/\Gamma_{\text{total}}$ Γ_{35}/Γ

VALUE (units 10^{-4})	CL%	DOCUMENT ID	TECN	COMMENT
<1.6	90	³⁷ ABLIKIM	13Q	BES3 $e^+e^- \rightarrow \psi(4040)$

³⁷ Assuming that interference effects between resonance and continuum can be neglected.

 $\Gamma(\Xi^0\bar{\Xi}^0)/\Gamma_{\text{total}}$ Γ_{36}/Γ

VALUE (units 10^{-4})	CL%	DOCUMENT ID	TECN	COMMENT
<1.8	90	³⁸ ABLIKIM	13Q	BES3 $e^+e^- \rightarrow \psi(4040)$

³⁸ Assuming that interference effects between resonance and continuum can be neglected.

 $\psi(4040)$ REFERENCES

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ABLIKIM	20O	PR D102 031101	M. Ablikim <i>et al.</i>	(BESIII Collab.)
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OSTERHELD	86	SLAC-PUB-4160	A. Osterheld <i>et al.</i>	(SLAC Crystal Ball Collab.)
BRANDELIK	78C	PL 76B 361	R. Brandelik <i>et al.</i>	(DASP Collab.)
Also		ZPHY C1 233	R. Brandelik <i>et al.</i>	(DASP Collab.)
FELDMAN	77	PRPL 33C 285	G.J. Feldman, M.L. Perl	(LBL, SLAC)
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